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U.S. Department  
of Transportation  
**National Highway  
Traffic Safety  
Administration**



DOT HS 808 360

March 1996

**Final Report**

# **1989 Ford Taurus 4-Door Sedan into Modified Heavy Truck Bumper**

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16. Abstract  This report documents a crash test that was conducted for research and development in support of reducing heavy truck aggressiveness. This test was conducted with a 1989 Ford Taurus 4-door sedan, VIN 1FABP52U8KG172214, at Transportation Research Center Inc. on May 25, 1995. The left front 50% of the test vehicle impacted the modified heavy truck bumper. The vehicle contained seventeen (17) accelerometers and one (1) instrumented Hybrid III driver dummy.			
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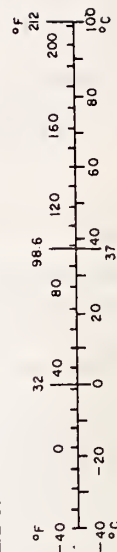
# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	tonnes	t
	(2000 lb)			
<b>VOLUME</b>				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

## Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
<b>VOLUME</b>				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



\* 1 in. = 2.54 exactly. For other exact conversions and more detailed tables, see NIS Misc., Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10.286.

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## Section 1.0

### **Purpose and Test Summary**

### Purpose and Test Summary

This test was conducted as research in support of reducing heavy truck aggressiveness. This test was conducted on May 25, 1995.

The test vehicle, a 1989 Ford Taurus 4-door sedan, was equipped with a 3.0-liter, 6-cylinder, transverse gasoline engine and a 4-speed automatic transmission. The test weight of the vehicle was 1592 kg. The vehicle was instrumented with seven (7) longitudinal axis accelerometers, five (5) lateral axis accelerometers, five (5) vertical axis accelerometer and two (2) seat belt force load cells. One (1) Part 572E dummy was seated in the left front outboard seating position according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Test Procedure TP-208-09. The dummy was instrumented in the head, chest, and pelvis with longitudinal, lateral, and vertical accelerometers. The dummy was also instrumented with two (2) femur load cells, and a chest deflection potentiometer.

The vehicle impacted the modified heavy truck bumper at 88.7 kph. The intended impact engagement was the left front 50% of the car with the left front of the truck bumper. The vehicle sustained 506 mm of static crush.

The dummy's head injury criterion, HIC, was 298. The dummy's chest deceleration with 3 milliseconds minimum duration was 39.7 g. The dummy's maximum chest deflection was 26.3 mm. The dummy's maximum left femur force was 2687 N. The dummy's maximum right femur force was 7,669 N.

The vehicle and dummy data were digitally sampled at 12,500 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The test was filmed by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras operating at approximately 500 frames per second.

Section 2.0 contains the vehicle, dummy, and test data. Appendix A contains the pre- and post-test still photographs. Appendix B contains the final test data plots. Appendix C contains miscellaneous test information.

### Data Acquisition Explanations

The vehicle's steering wheel hub X-axis acceleration data channel, SHIXG1, exceeded its data channel full scale output at approximately 54 milliseconds.



## Section 2.0

### Vehicle, Dummy, and Test Data

Table 1 Crash Test Summary

Test type:	Vehicle into Modified Truck Bumper
Test date:	05/25/95
Test time:	1437
Ambient temperature:	13° C
Vehicle:	1989 Ford Taurus 4-door sedan
Vehicle test weight:	1592 kg
Offset:	Left front 50% of vehicle
Impact angle: <sup>1</sup>	0°
Impact velocity: <sup>2</sup>	Primary = 88.7 kph Secondary = 88.7 kph
Maximum static crush:	506 mm
Dummies:	Driver #043
Type:	Part 572 E
Location:	Left front
Restraint:	3-point unbelt
Number of data channels:	31
Number of cameras:	
High-speed	5
Real-time	1

<sup>1</sup> With respect to two track centerline.

<sup>2</sup> Speed trap measurement ( $\pm .08$  kph accuracy)

Table 2 Test Vehicle Information

Vehicle manufacturer:	Ford Motor Company
Make/model:	Ford/Taurus
VIN:	1FABP52U8KG172214
Model year:	1989
Body style:	4-door sedan
Color:	White
Engine data:	
Type:	Transverse
Cylinders:	6
Displacement:	3.0-liter
Transmission data:	<u>4</u> Speed, <u>  </u> Manual, <u>  X</u> Automatic, <u>  X</u> FWD, <u>  </u> RWD, <u>  </u> 4WD
Date vehicle received:	05/23/95
Odometer reading:	72,291
Dealer's name and address:	NA

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	Driver only	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	No
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by:	Ford Motor Company
Date of manufacture:	12/88
VIN:	1FABP52U8KG172214
GVWR:	4660 lbs.
GAWR: Front:	2595 lbs.
Rear:	2092 lbs.

Table 2 Test Vehicle Information, Cont'd.

Tires on vehicle (mfr., line, size): Superguard, Touring Radial, P205/70R14

Tire pressure with maximum  
capacity vehicle load: Front: 240 kPa  
Rear: 240 kPa

Spare tire (mfr., line, size): Michelin, Tex, T135/80R14

Type of seats: Front: Split bench  
Rear: Bench

Type of front seat backs: Manually adjustable

Maximum width: 1803 mm

Wheelbase: 2692 mm

Location of "Recommended Tire Pressure" label:

The label was located on the passenger's rear door jam.

Data from vehicle's "Recommended Tire Pressure" label:

Recommended tire size: P205/70R14

Recommended cold  
tire pressure: Front: 35 psi  
Rear: 35 psi

Seating capacity: Front: 3  
Rear: 3  
Total: 6

Cargo load: 200 lbs.

Test vehicle attitude:

Delivered attitude: LF 701 mm; RF 701 mm; LR 648 mm; RR 643 mm

Pre-test attitude: LF 691 mm; RF 701 mm; LR 605 mm; RR 607 mm

Post-test attitude: LF 760 mm; RF 640 mm; LR 576 mm; RR 586 mm

Table 2 Test Vehicle Information, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	467 kg	Right rear	252 kg
Left front	465 kg	Left rear	256 kg
Total front weight	932 kg	(64.7% of total vehicle weight)	
Total rear weight	508 kg	(35.3% of total vehicle weight)	
Total test weight	1440 kg		
Target test weight <sup>1</sup>	1581 kg		

Weight of test vehicle with required dummies and 76 kg of cargo weight:

Right front	455	kg	Right rear	323	kg
Left front	489	kg	Left rear	325	kg
Total front weight	944	kg	(59.3% of total vehicle weight)		
Total rear weight	648	kg	(40.7% of total vehicle weight)		
Total test weight	1592	kg	(0.7% over target test weight)		
Weight of ballast secured in vehicle cargo area:			None		
Components removed to meet target test weight:			None		
CG rearward of front wheel centerline:			1096 mm		

<sup>1</sup> Provided by Vehicle Research and Test Center.

Table 3 Post-Impact Data

Test number:	950525
Date of test:	05/25/95
Time of test:	1437
Type of test:	Vehicle into Modified Truck Bumper
Impact angle: <sup>1</sup>	0°
Offset:	Left Front 50% of Vehicle
Ambient temperature at impact area:	13° C
Temperature in occupant compartment:	18° C
Impact velocity:	
Primary	88.7 kph
Secondary	88.7 kph
Distance from heavy truck to vehicle:	
Entering trap	381 mm
Exiting trap	51 mm

Test vehicle static crush:

Overall length of test vehicle:

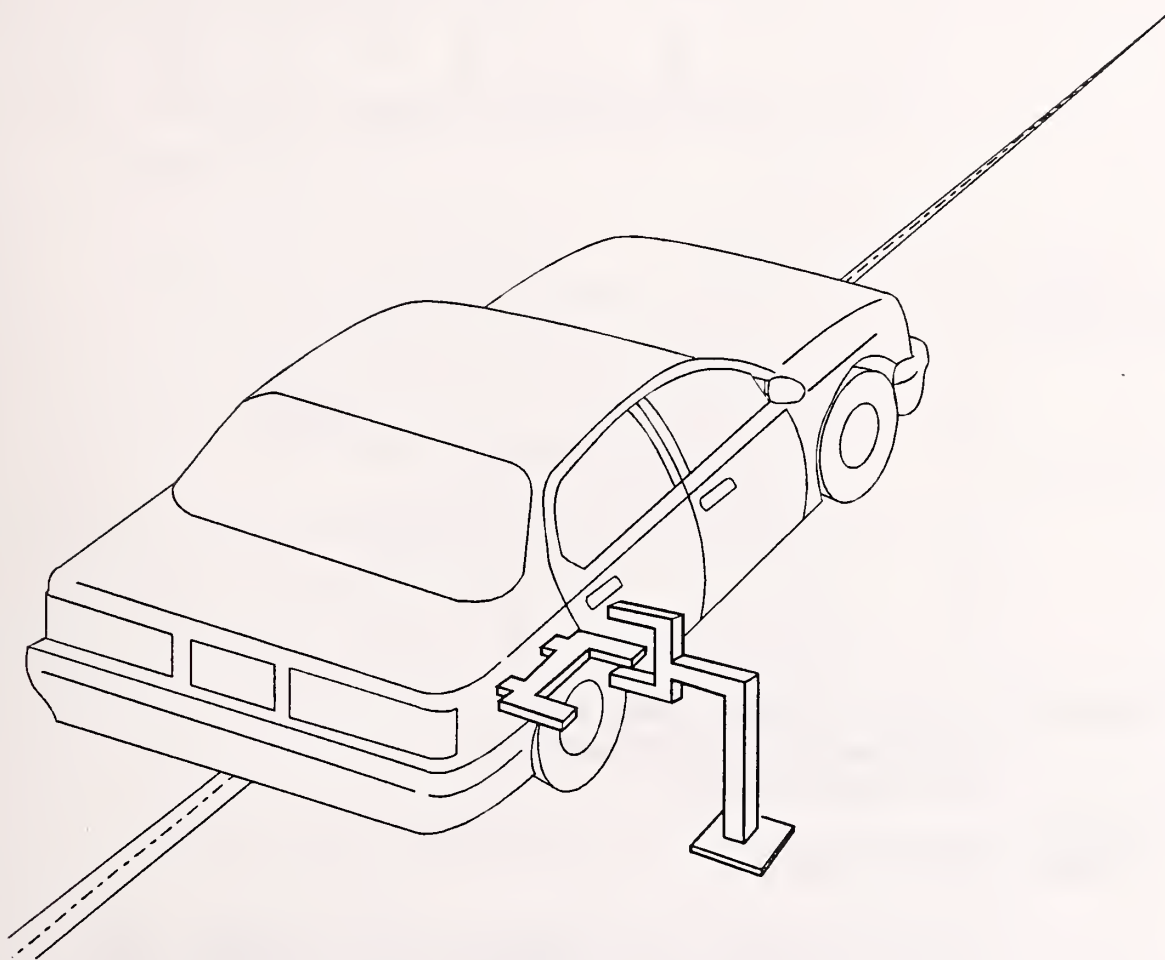
Pre-test:	L	4636 mm;	C	4788 mm;	R	4636 mm
Post-test:	L	4130 mm;	C	4590 mm;	R	4854 mm
Total crush:	L	506 mm;	C	198 mm;	R	-218 mm

Average crush: 162 mm

<sup>1</sup> As measured clockwise from the subject vehicle's front longitudinal centerline.



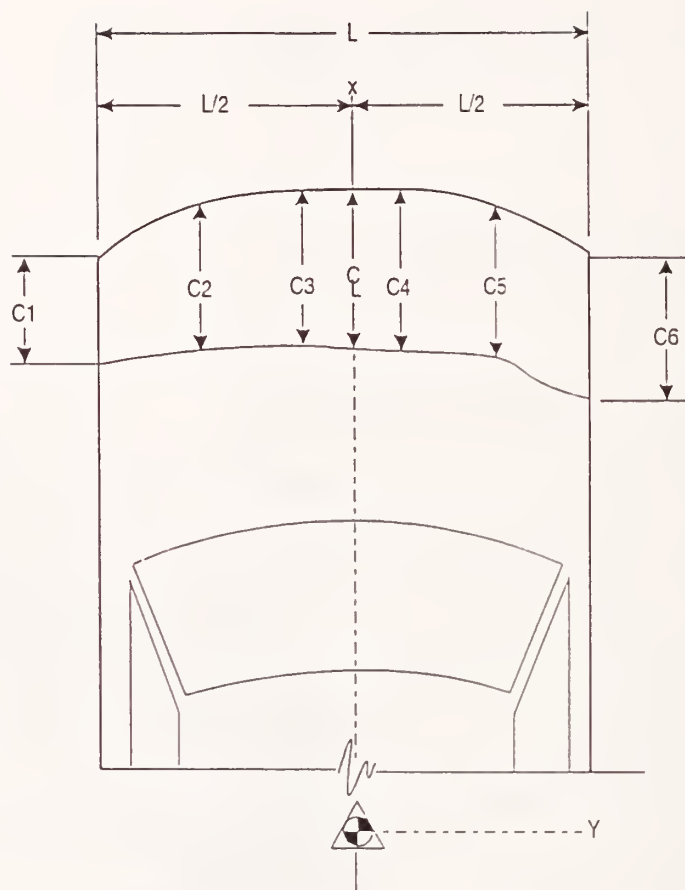
Figure 1 Impact Velocity Measurement System



The final vane clears emitter/receiver 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Vehicle Crush



NOTES: L is pre-test length of contact surface.  
C1 through C6 are spaced equally apart.  
CL is vehicle centerline.

Vehicle: 1989 Ford Taurus

	Pre-test	Post-test <sup>1</sup>	Crush
L	1524 mm		
C1	4636 mm	4130 mm	506 mm
C2	4719 mm	4341 mm	378 mm
C3	4762 mm	4483 mm	279 mm
C4	4770 mm	4674 mm	96 mm
C5	4729 mm	4773 mm	-44 mm
C6	4636 mm	4854 mm	-218 mm
CL	4788 mm	4590 mm	198 mm

<sup>1</sup> Post-test measurements taken to plane of front bumper mounting flanges because the front bumper was destroyed during the impact event.

**Figure 3 Pre-Test and Post-Test Measurement Points**

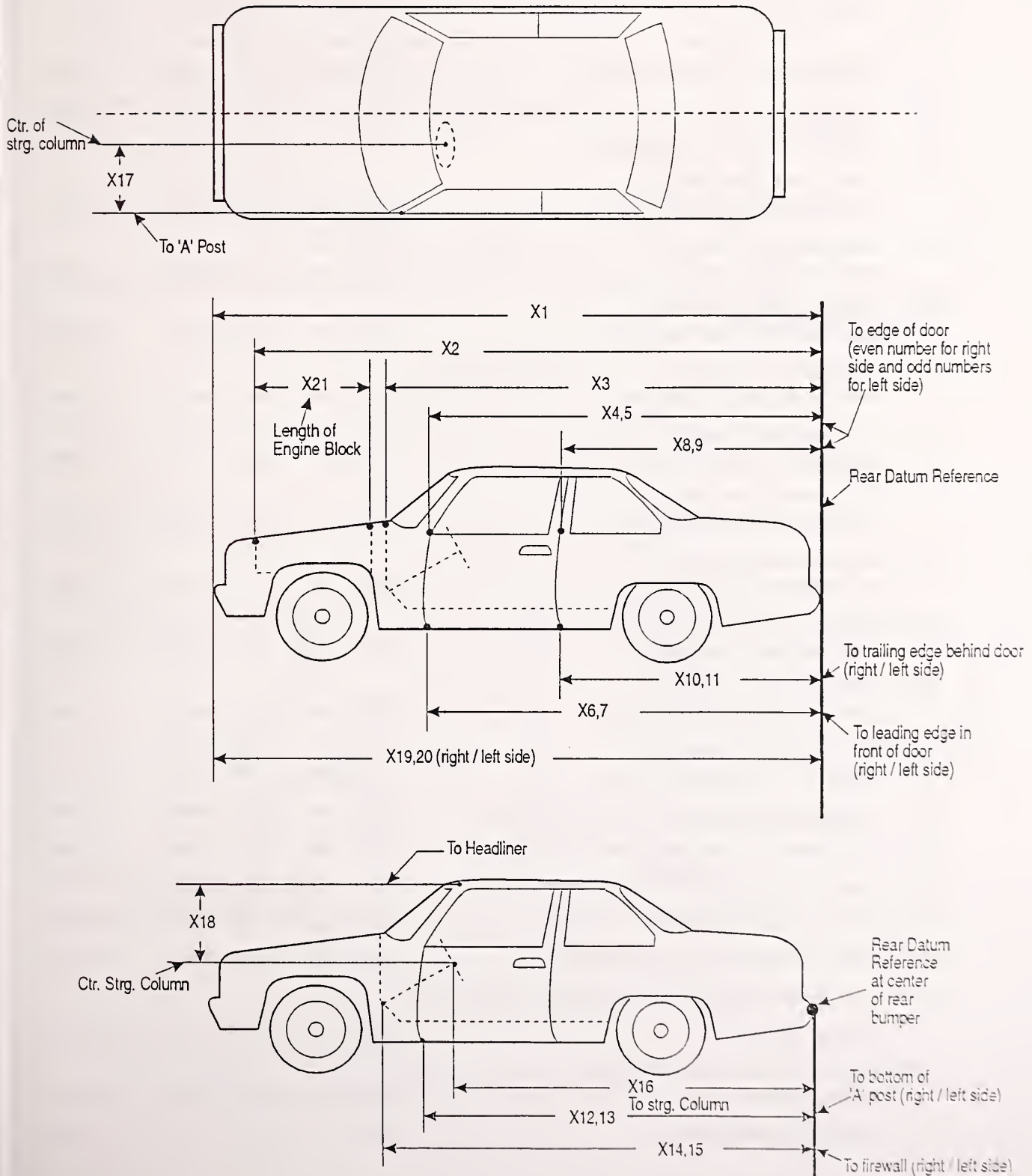
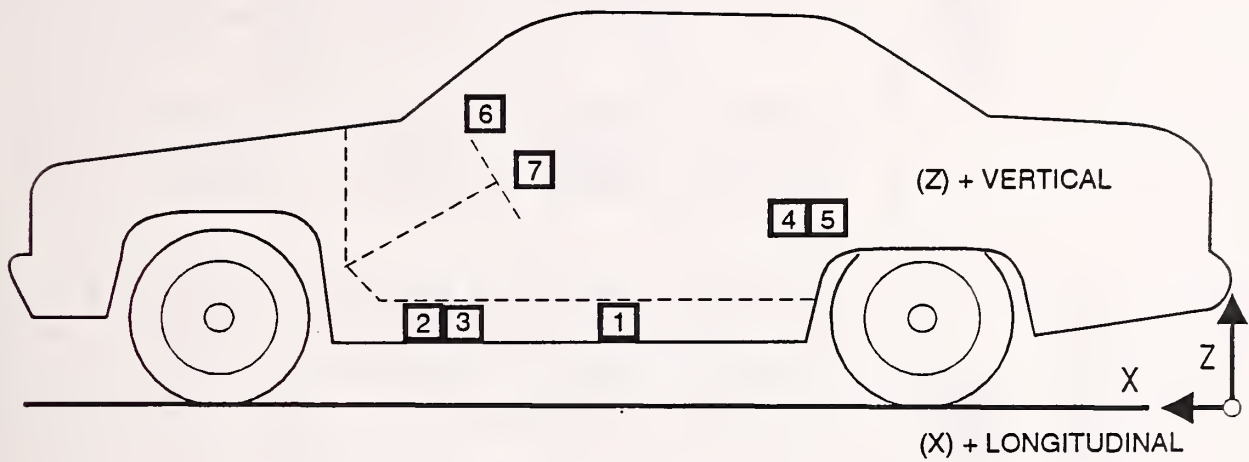


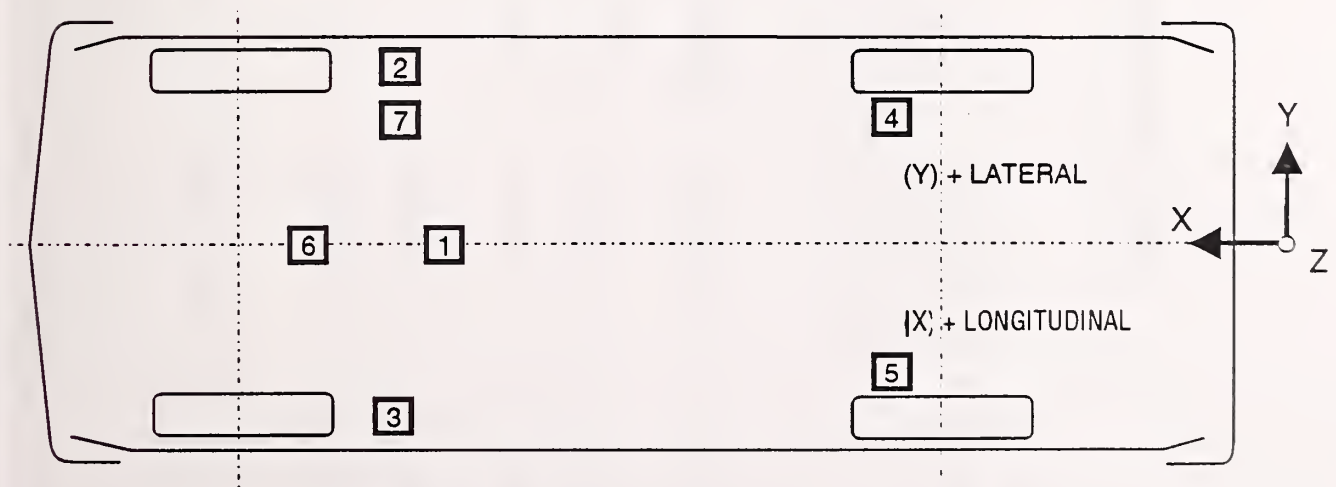
Table 4 Impacted Vehicle Measurements

<u>Vehicle Make/Model:</u> Ford/Taurus		<u>Test Number:</u> 950525					
No.	Type of measurement	Pre-test		Post-test		Diff.	
X1	Total length of vehicle at centerline	4788	mm	4590	mm	198	mm
X2	Rear surface of vehicle to front of engine block	4229	mm	4191	mm	38	mm
X3	Rear surface of vehicle to firewall	3599	mm	3561	mm	38	mm
X4	Rear surface of vehicle to upper leading edge of right door	3305	mm	3307	mm	-2	mm
X5	Rear surface of vehicle to upper leading edge of left door	3299	mm	3282	mm	17	mm
X6	Rear surface of vehicle to lower leading edge of right door	3226	mm	3226	mm	0	mm
X7	Rear surface of vehicle to lower leading edge of left door	3226	mm	3208	mm	18	mm
X8	Rear surface of vehicle to upper trailing edge of right door	2215	mm	2228	mm	-13	mm
X9	Rear surface of vehicle to upper trailing edge of left door	2217	mm	2200	mm	17	mm
X10	Rear surface of vehicle to lower trailing edge of right door	2192	mm	2187	mm	5	mm
X11	Rear surface of vehicle to lower trailing edge of left door	2189	mm	2164	mm	25	mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3208	mm	3216	mm	-8	mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3221	mm	3195	mm	26	mm
X14	Rear surface of vehicle to firewall - right side	3556	mm	3581	mm	-25	mm
X15	Rear surface of vehicle to firewall - left side	3548	mm	3531	mm	17	mm
X16	Rear surface of vehicle to steering wheel center	2814	mm	2797	mm	17	mm
X17	Center of steering column to "A" post	274	mm	282	mm	-8	mm
X18	Center of steering column to headliner	432	mm	424	mm	8	mm
X19	Rear surface of vehicle to right side of front bumper	4636	mm	4854	mm	-218	mm
X20	Rear surface of vehicle to left side of front bumper	4636	mm	4130	mm	506	mm
X21	Length of engine block	381	mm	381	mm	0	mm

Figure 4 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 5 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 950525 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 VEHICLE CENTER OF GRAVITY	2682 mm	-25 mm	328 mm				
LONGITUDINAL				4.9 g	@ 133.8 ms	23.8 g	@ 75.2 ms
LATERAL				9.7 g	@ 126.7 ms	34.3 g	@ 63.7 ms
VERTICAL				28.4 g	@ 76.2 ms	31.7 g	@ 66.6 ms
RESULTANT				43.7 g	@ 64.2 ms		
2 LEFT FRONT SILL	2944 mm	737 mm	356 mm				
LONGITUDINAL				41.1 g	@ 102.1 ms	46.2 g	@ 97.3 ms
LATERAL				25.5 g	@ 119.6 ms	34.9 g	@ 66.3 ms
VERTICAL				44.0 g	@ 102.7 ms	28.7 g	@ 97.2 ms
RESULTANT				60.1 g	@ 102.2 ms		
3 RIGHT FRONT SILL	2918 mm	-737 mm	356 mm				
LONGITUDINAL				4.4 g	@ 124.8 ms	30.4 g	@ 63.9 ms
LATERAL				11.2 g	@ 122.8 ms	41.8 g	@ 63.7 ms
VERTICAL				6.4 g	@ 8.9 ms	12.6 g	@ 77.1 ms
RESULTANT				51.7 g	@ 63.7 ms		
4 LEFT REAR SEAT	1651 mm	726 mm	358 mm				
LONGITUDINAL				4.1 g	@ 147.8 ms	21.6 g	@ 88.9 ms
LATERAL				3.7 g	@ 136.2 ms	11.4 g	@ 68.5 ms
VERTICAL				12.2 g	@ 113.7 ms	6.9 g	@ 97.5 ms
RESULTANT				21.8 g	@ 88.8 ms		



Table 5 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 950525 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
5 RIGHT REAR SEAT LONGITUDINAL LATERAL VERTICAL RESULTANT	1633 mm	-726 mm	358 mm	5.0 g	@ 126.0 ms	29.2 g	@ 70.2 ms
				6.3 g	@ 134.3 ms	13.1 g	@ 64.7 ms
				12.0 g	@ 75.1 ms	6.4 g	@ 91.4 ms
				32.1 g	@ 64.6 ms		
6 DASH PANEL CENTER LONGITUDINAL	3231 mm	46 mm	945 mm	35.2 g	@ 70.0 ms	35.4 g	@ 65.7 ms
7 STEERING WHEEL HUB LONGITUDINAL <sup>1</sup>	3485 mm	249 mm	551 mm	73.7 g	@ 57.8 ms	196.0 g	@ 53.8 ms

REFERENCE: X: + FORWARD FROM REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

<sup>1</sup> See DATA ACQUISITION EXPLANATIONS

Table 6 Dummy Data Summary

TEST NUMBER: 950525

DRIVER DUMMY SERIAL NUMBER: 043

POSITIVE  
DIRECTION

NEGATIVE  
DIRECTION

---

HEAD ACCELERATION

LONGITUDINAL	2.3 g	@ 240.1 ms	24.5 g	@ 95.0 ms
LATERAL	5.4 g	@ 253.8 ms	31.3 g	@ 126.6 ms
VERTICAL	0.4 g	@ 4.5 ms	39.6 g	@ 94.2 ms
RESULTANT	47.8 g	@ 95.0 ms		
HIC	298 from 88.2 to 124.2			

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CHEST ACCELERATION

LONGITUDINAL	9.5 g	@ 125.1 ms	27.3 g	@ 82.0 ms
LATERAL	3.4 g	@ 142.2 ms	36.5 g	@ 96.0 ms
VERTICAL	17.0 g	@ 127.4 ms	8.7 g	@ 81.5 ms
RESULTANT	41.4 g	@ 95.0 ms		
3 MSEC	39.7			

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CHEST DEFLECTION

LONGITUDINAL	26.3 mm	@ 91.1 ms	0.0 mm	@ 12.6 ms
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PELVIS ACCELERATION

LONGITUDINAL	14.2 g	@ 126.6 ms	84.8 g	@ 69.0 ms
LATERAL	35.3 g	@ 69.0 ms	37.4 g	@ 101.3 ms
VERTICAL	16.0 g	@ 69.1 ms	5.5 g	@ 70.5 ms
RESULTANT	92.6 g	@ 69.0 ms		

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FEMUR LOAD

LEFT	513.1 N	@ 59.8 ms	2687.3 N	@ 69.4 ms
RIGHT	682.1 N	@ 91.0 ms	7668.9 N	@ 69.1 ms

---

POSITIVE DIRECTION

LONGITUDINAL: FORWARD  
 LATERAL: LEFTWARD  
 VERTICAL: UPWARD  
 FORCE: TENSION

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD  
 LATERAL: RIGHTWARD  
 VERTICAL: DOWNWARD  
 FORCE: COMPRESSION

Table 7 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver #043</u>	<u>Passenger #NA</u>
Head	None	
Chest	None	
Abdomen	None	
Left knee	Instrument panel	
Right knee	Instrument panel	

Door Opening:

	<u>Left</u>	<u>Right</u>
Front	Easy	Easy
Rear	Easy	Easy

Seat Movement:

	<u>Seat Back Failure</u>	<u>Seat Shift</u>
Front	None	None
Rear	NA	NA

Glazing Damage: The windshield cracked from lower left corner.

Other Notable Impact Effects: The left front tire was flattened.

### Dummy Kinematic Summary

Upon impact the driver dummy translated forward and to the left across the seat. Both knees impacted the lower instrument panel. The dummy was restrained by the three-point unbelt. The dummy rebounded rearward and to the right. The dummy then came to rest facing forward and slightly leaning toward the right in the driver's seating position.

Figure 5 Dummy Measurement Locations for Front Seat Occupants

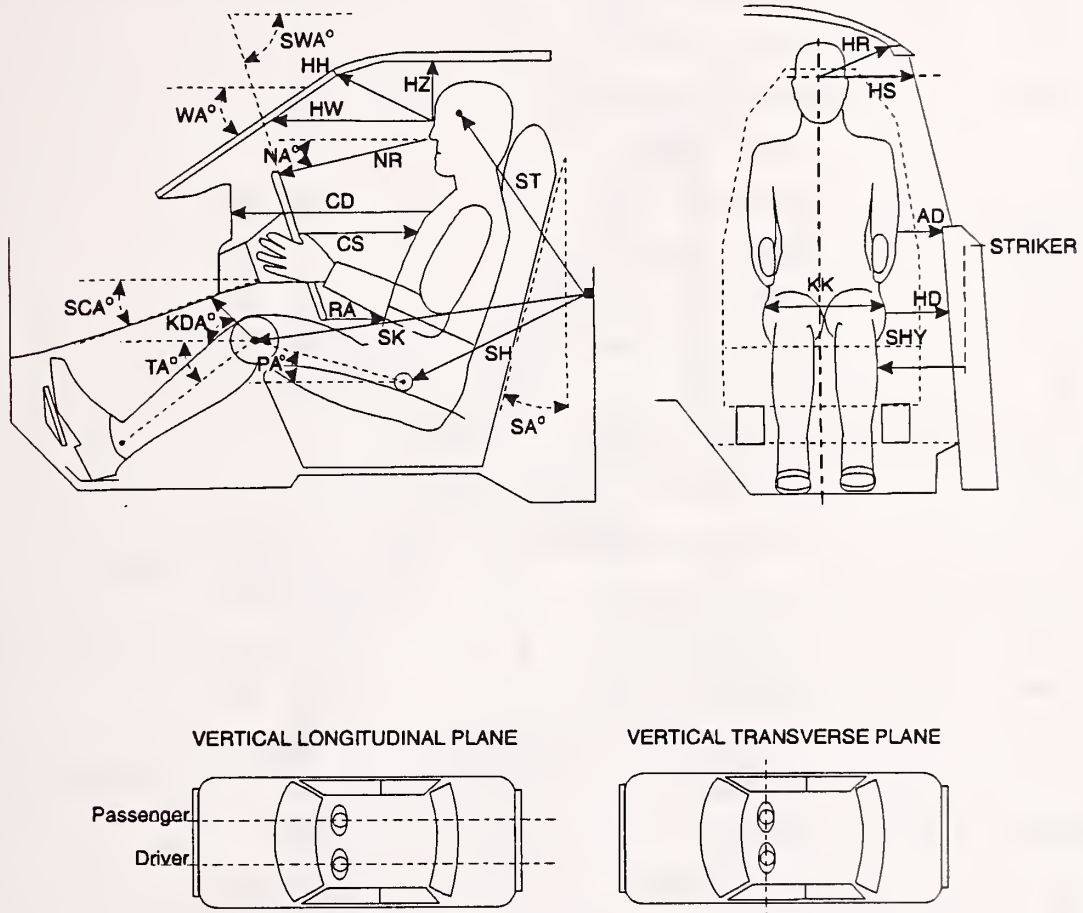


Table 8 Dummy Measurement Data For Front Seat Occupants

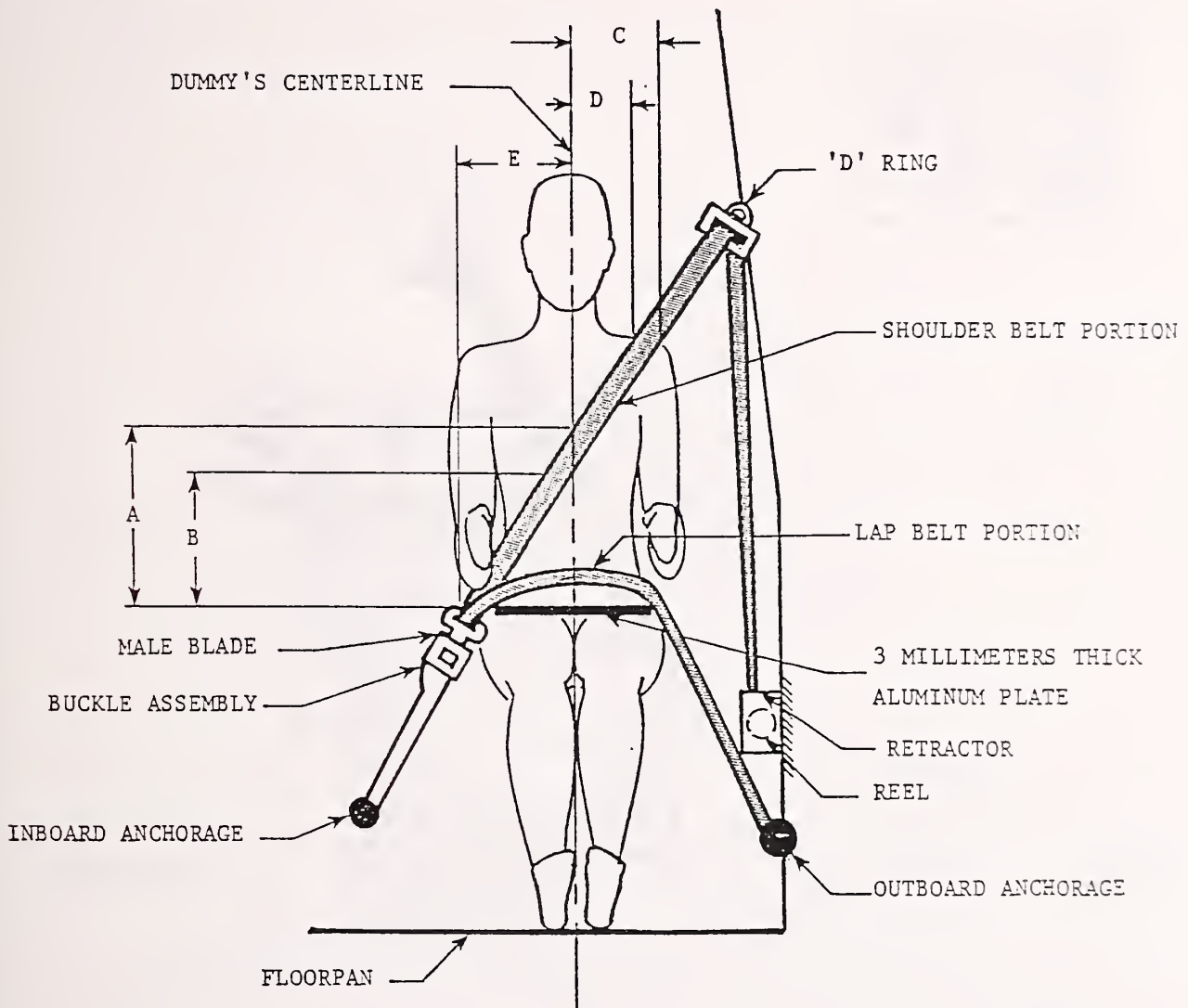
Designation	Type of Measurement	Driver (Serial #043)	Passenger (Serial #NA)
WA	Windshield angle	29.5°	
SWA	Steering wheel angle	67°	
SCA	Steering column angle	23°	
SA	Seat back angle	23°	
HZ	Head to roof	205 mm	
HH	Head to header	350 mm	
HW	Head to windshield	597 mm	
HR	Head to side header	230 mm	
NR	Nose to rim	400 mm	
NA	Nose to rim angle	8°	
CD	Chest to dash	543 mm	
CS	Steering wheel to chest	332 mm	
RA	Rim to abdomen	201 mm	
KDL	Left knee to dash	187 mm	
KDR	Right knee to dash	188 mm	
KDA	Outboard knee to dash angle	27°	
PA	Pelvic angle	24°	
TA	Tibial angle	39°	
KK	Knee to knee	270 mm	
ST <sup>1</sup>	Striker to head	465 mm	
	Striker to head angle	-74°	
SK <sup>1</sup>	Striker to knee	599 mm	
	Striker to knee angle	10°	
SH <sup>1</sup>	Striker to H-point	287 mm	
	Striker to H-point angle	52°	
SHY	Striker to H-point (Y dir.)	250 mm	
HS	Head to side window	344 mm	
HD	H-point to door	154 mm	
AD	Arm to door	138 mm	

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

<sup>1</sup> A negative angle indicates the measurement point was located above the striker.



**Figure 6 Seat Belt Positioning Data**

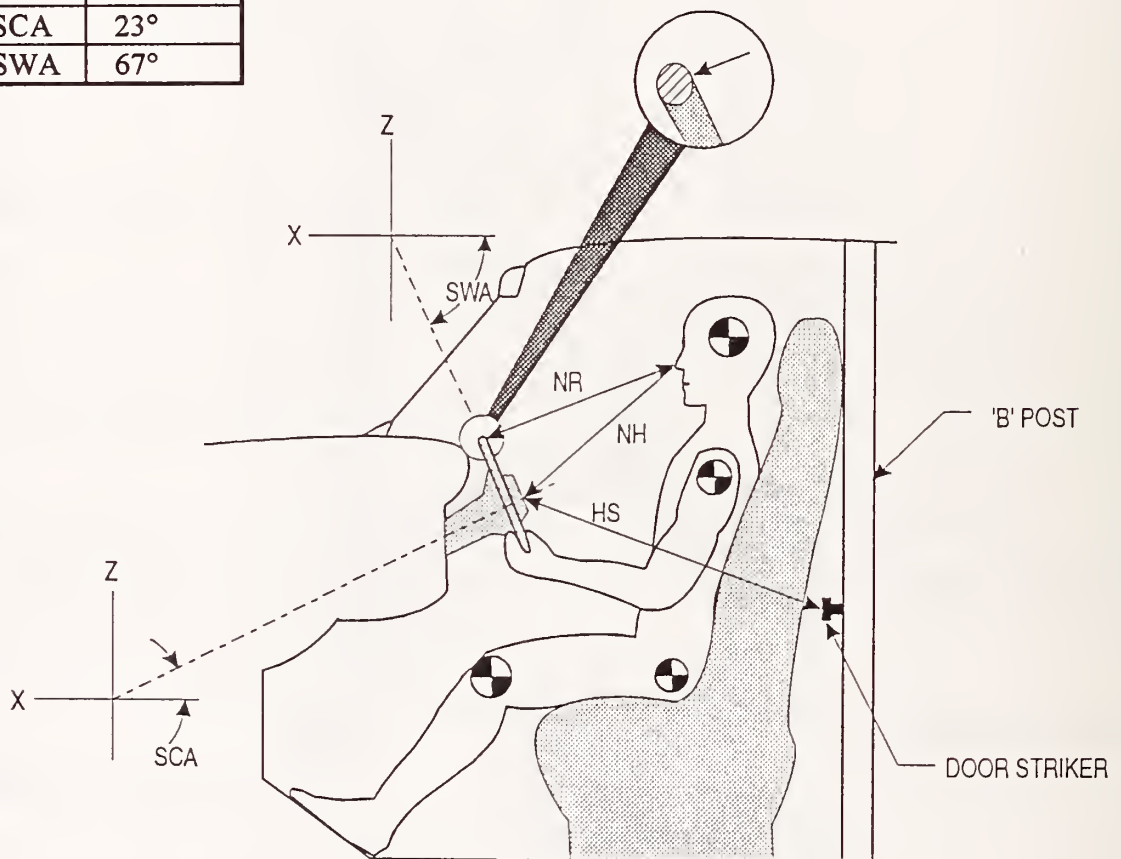


		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	302	NA
B	Top surface of aluminum plate to belt lower edge	223	NA
C	Dummy centerline to outer edge of belt at chest flesh top	124	NA
D	Dummy centerline to inner edge of belt at chest flesh top	64	NA
E	Dummy centerline to intersection of upper torso belt and lap belt	187	NA

All distance measurements are in millimeters.

Figure 7 Driver Dummy To Steering Column/Wheel Assembly Data

NR	400 mm
NH	402 mm
HS	584 mm
SCA	23°
SWA	67°



Position of steering column tilting and telescoping adjustments, if any:

The steering column was fastened in the middle of the adjustment range.

- NR = Distance from tip of dummy's nose to top rear surface of steering wheel rim.
- NH = Distance from tip of dummy's nose to center of steering column hub.
- HS = Distance from center of steering column hub to the forward surface of the door lock striker pin.
- SCA = Angle of steering column relative to horizontal.
- SWA = Angle of steering wheel relative to horizontal.

Figure 8 Camera Positions

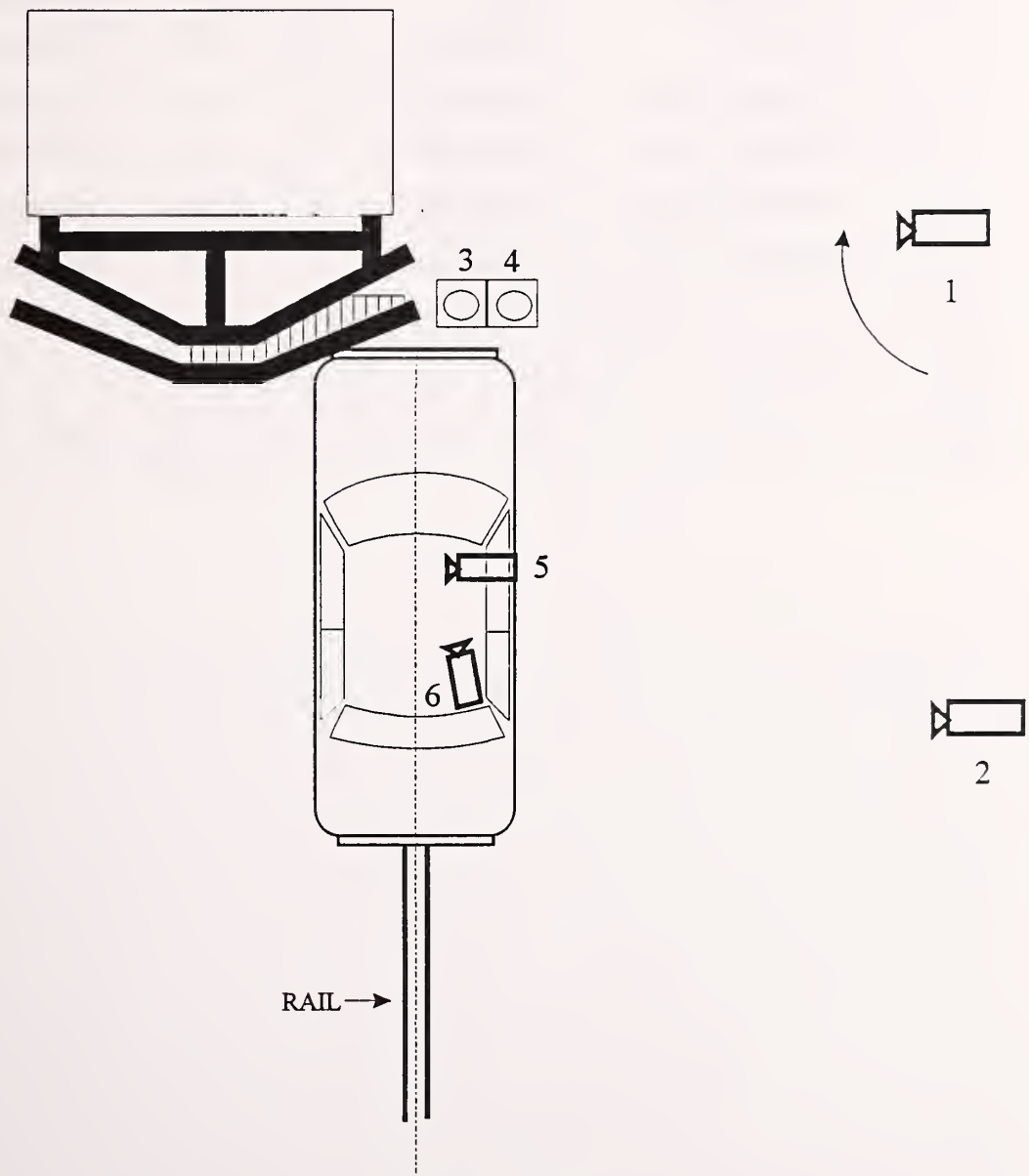


Table 9 Motion Picture Camera Information

Camera Number	Location	Type	Lens (mm)	Speed (Fps)	Purpose of Camera Data
1	Left panning	Bolex	16	24	Real-time documentation
2	Left wide	Photosonic	13	502	Vehicle dynamics
3	Overhead wide	Photosonic	8.5	498	Vehicle dynamics
4	Overhead tight	Photosonic	35	508	Vehicle dynamics
5	Onboard car front	Photosonic	8	998	Dummy kinematics
6	Onboard car rear	photosonic	8	1002	Dummy kinematics

Appendix A

Photographs







Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View



Figure A-4 Post-Test Left Side View





Figure A-5 Pre-Test Left Rear View



Figure A-6 Post-Test Left Rear View



Figure A-7 Pre-Test Rear View



Figure A-8 Post-Test Rear View





Figure A-9 Pre-Test Right Side View



Figure A-10 Post-Test Right Side View



Figure A-11 Pre-Test Right Front Three-Quarter View



Figure A-12 Post-Test Right Front Three-Quarter View

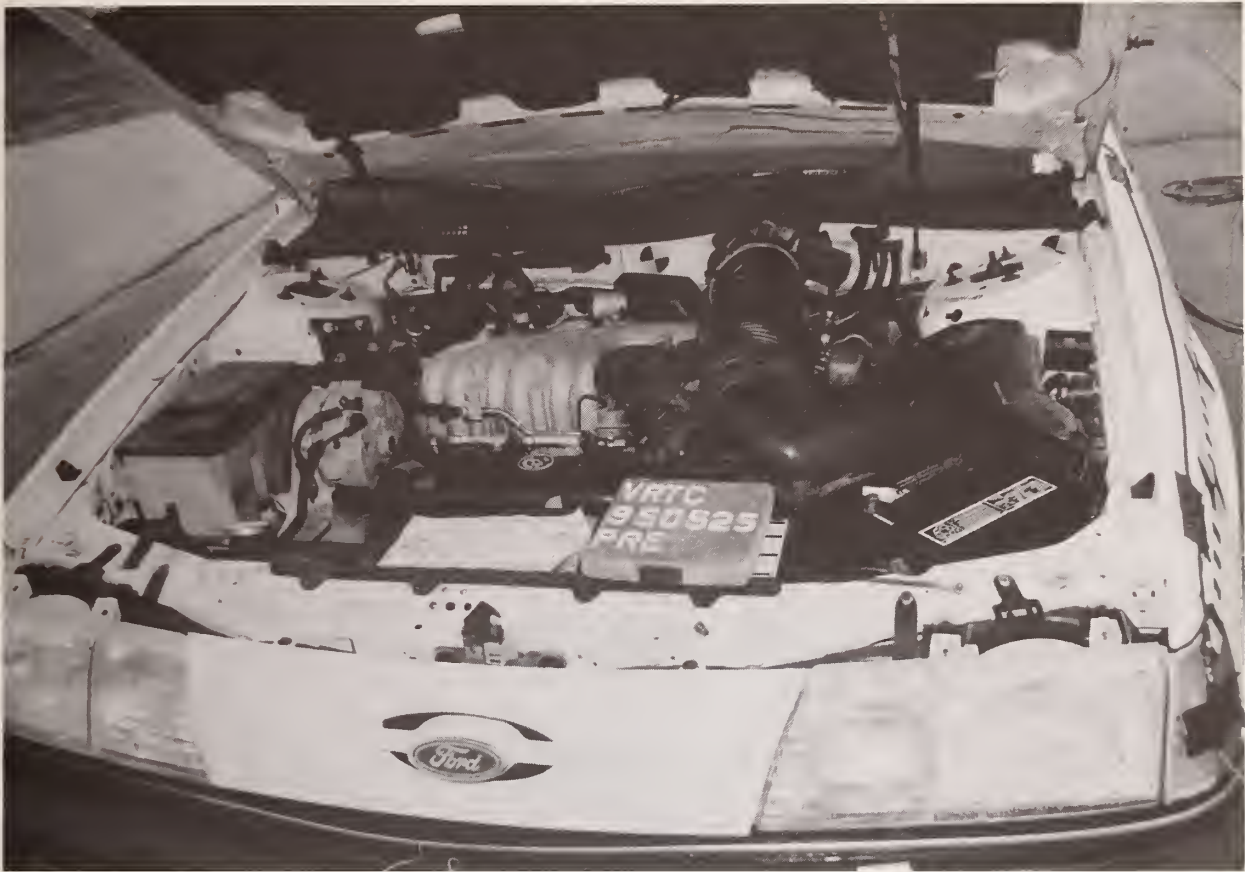


Figure A-13 Pre-Test Engine Compartment View

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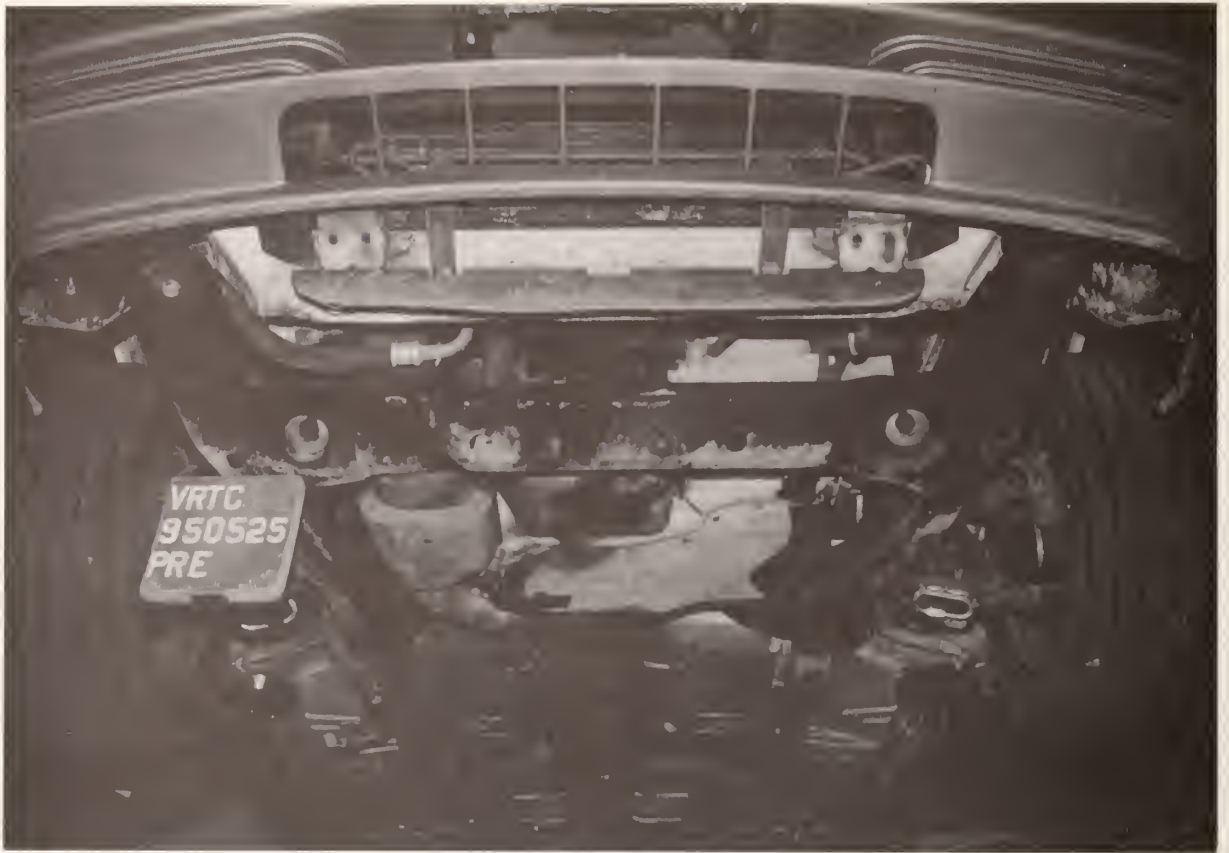


Figure A-14 Pre-Test Front Underbody View



Figure A-15 Post-Test Front Underbody View

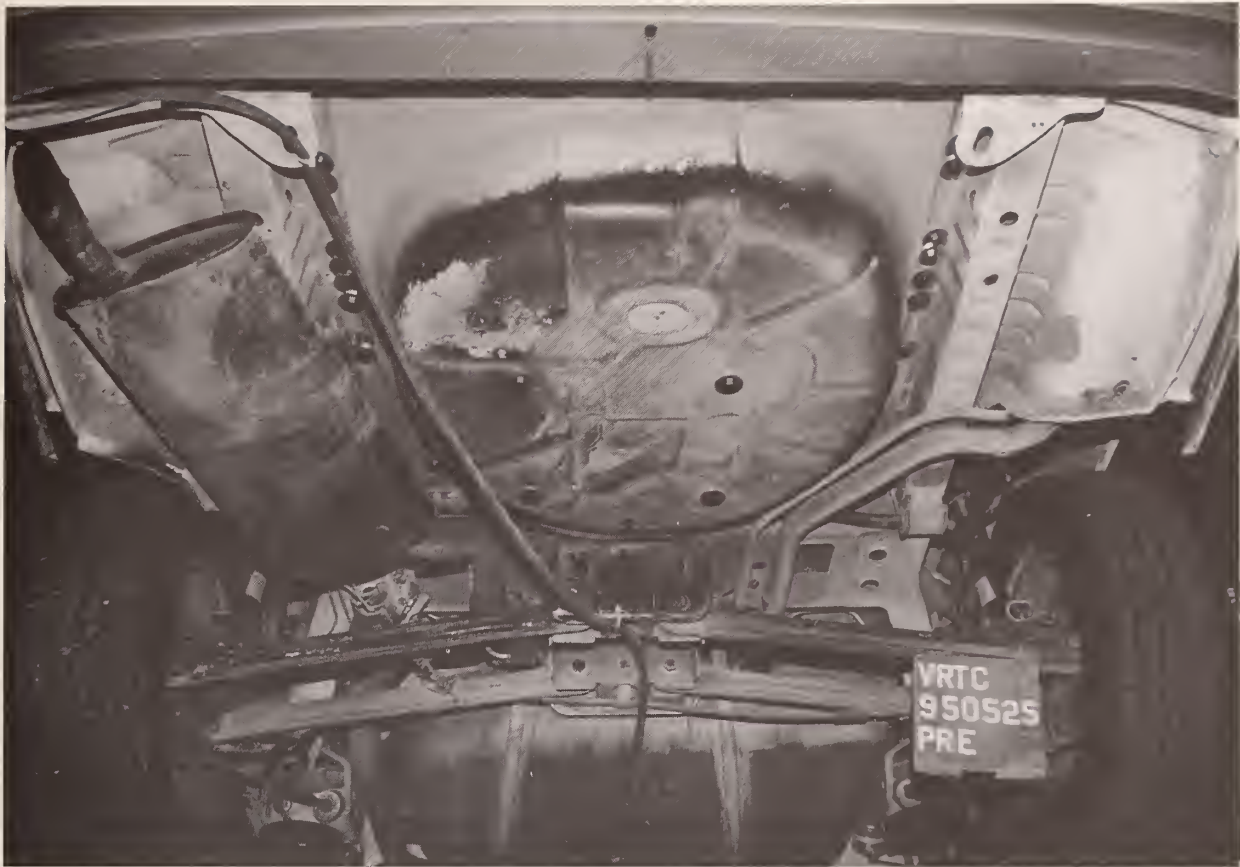


Figure A-16 Pre-Test Rear Underbody View



Figure A-17 Post-Test Rear Underbody View





Figure A-18 Pre-Test Vehicle and Truck Bumper Engagement - View 1



Figure A-19 Pre-Test Vehicle and Truck Bumper Engagement - View 2



Figure A-20 Pre-Test Truck Bumper - View 1



Figure A-21 Post-Test Truck Bumper - View 1



Figure A-22 Pre-Test Truck Bumper - View 2



Figure A-23 Post-Test Truck Bumper - View 2



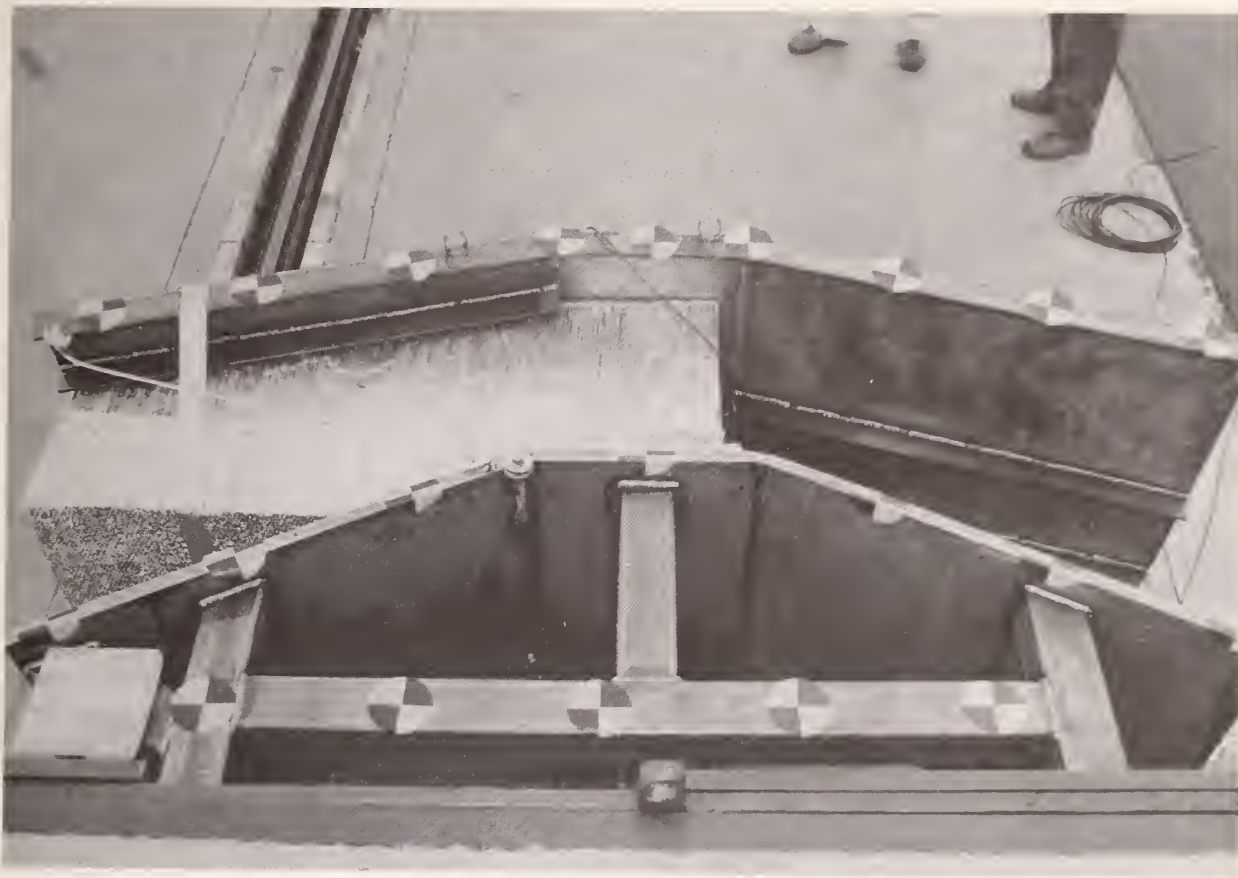


Figure A-24 Pre-Test Truck Bumper - View 3

Intentionally Left Blank

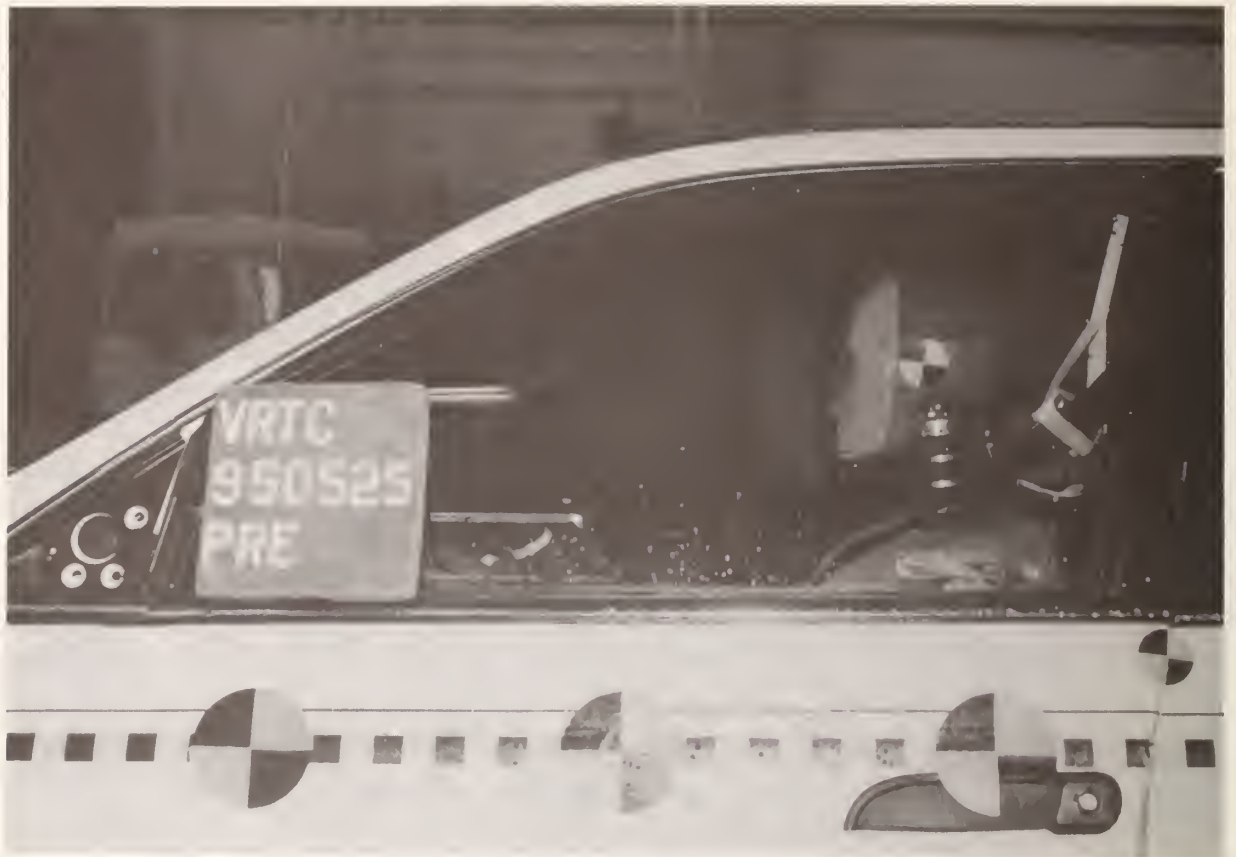


Figure A-25 Pre-Test Driver Dummy - View 1



Figure A-26 Post-Test Driver Dummy - View 1



Figure A-27 Pre-Test Driver Dummy Frontal View

Intentionally Left Blank





Figure A-28 Pre-Test Driver Dummy and Vehicle Interior - View 1



Figure A-29 Pre-Test Driver Dummy and Vehicle Interior - View 2





Figure A-30 Post-Test Driver Dummy Over Shoulder View



Figure A-31 Post-Test Driver Dummy Right Side View



Figure A-32 Post-Test Driver Dummy Head Contact View

Intentionally Left Blank



Figure A-33 Post-Test Driver Dummy Knee Contact - View 1



Figure A-34 Post-Test Driver Dummy Knee Contact - View 2



## Appendix B

### Data Plots



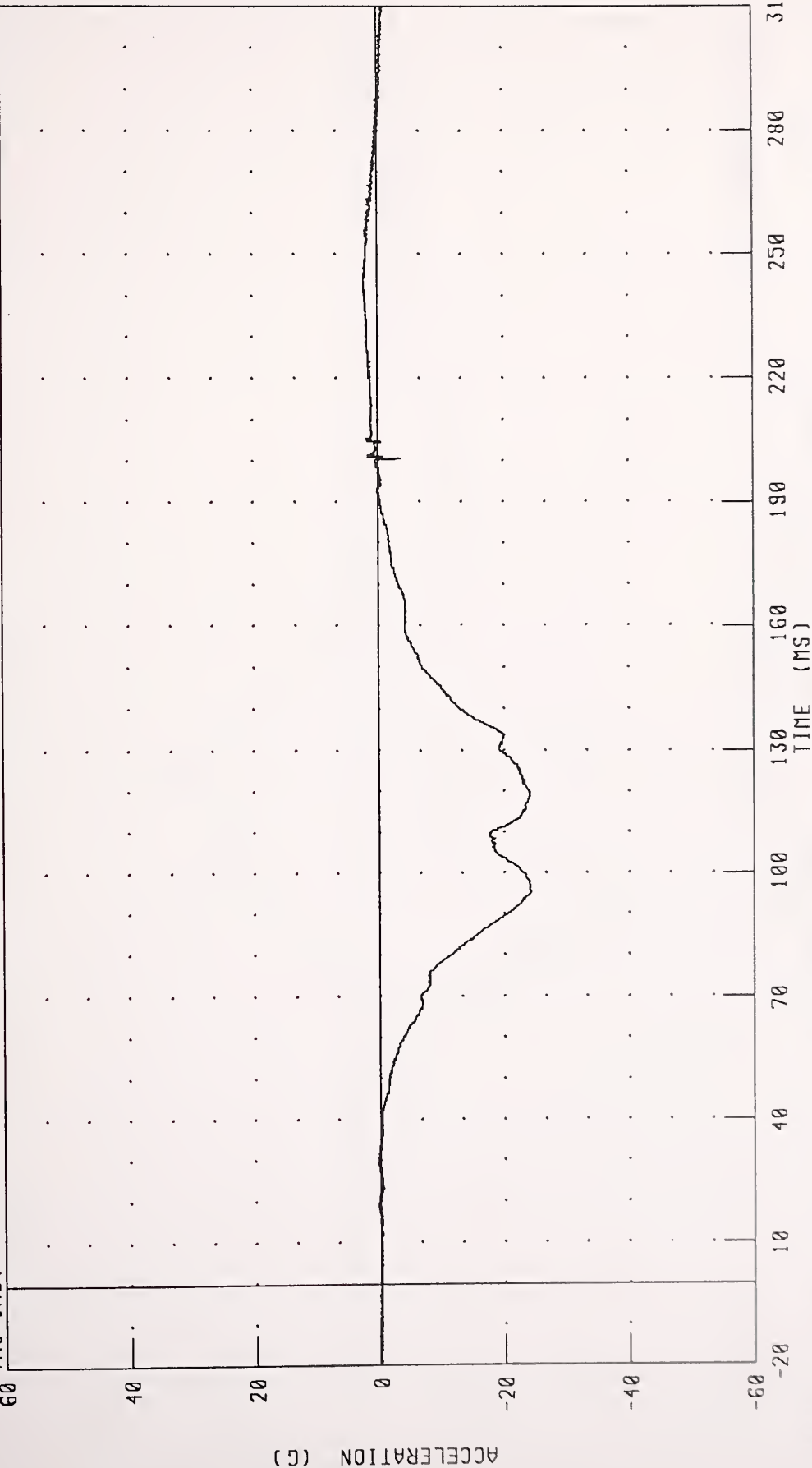


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL HEDXC1 FILTER CH CLASS 1000

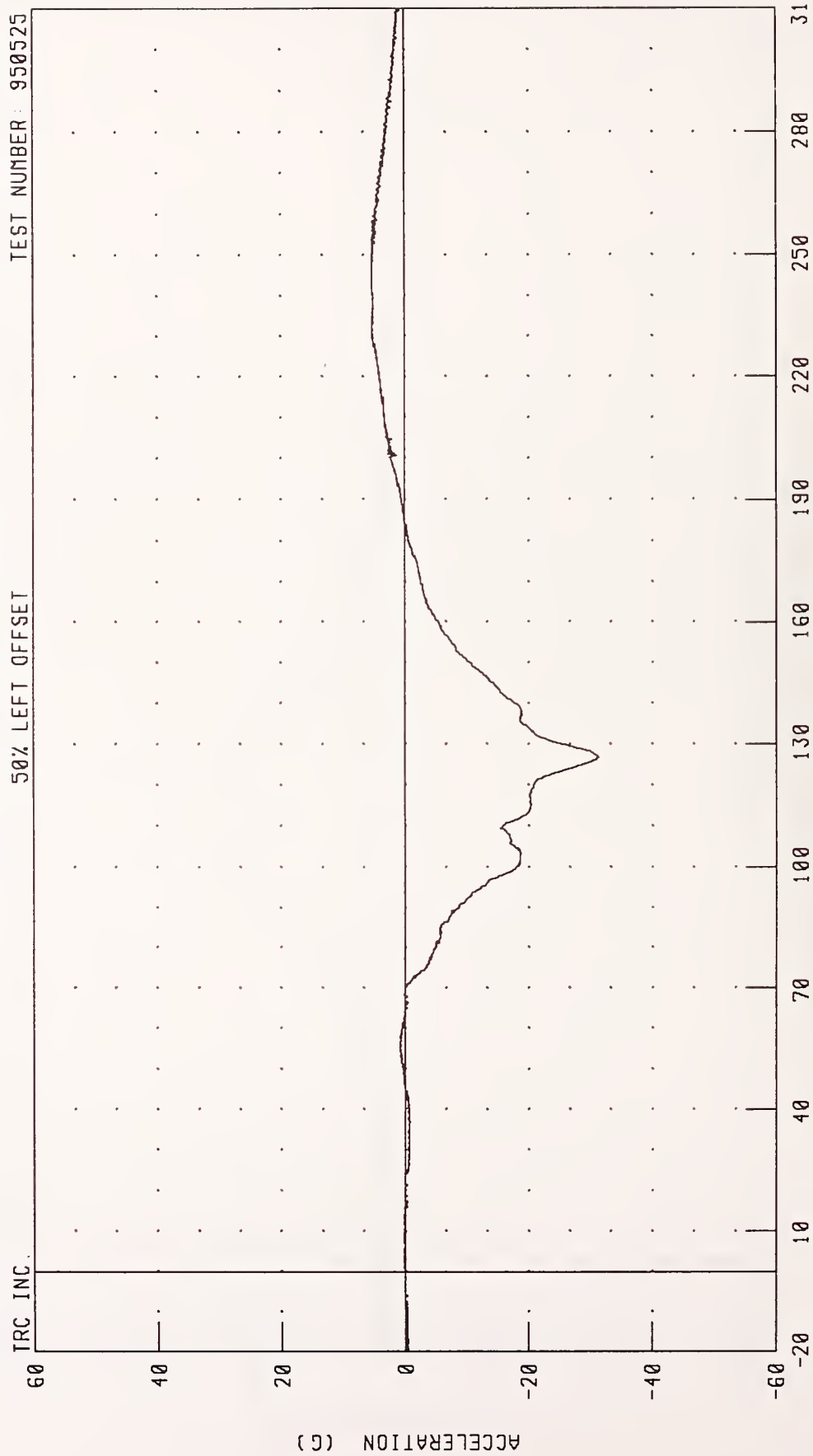
PEAK DATA: 2 26 G @ 240 08 MS; -24 46 G @ 95 04 MS



1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

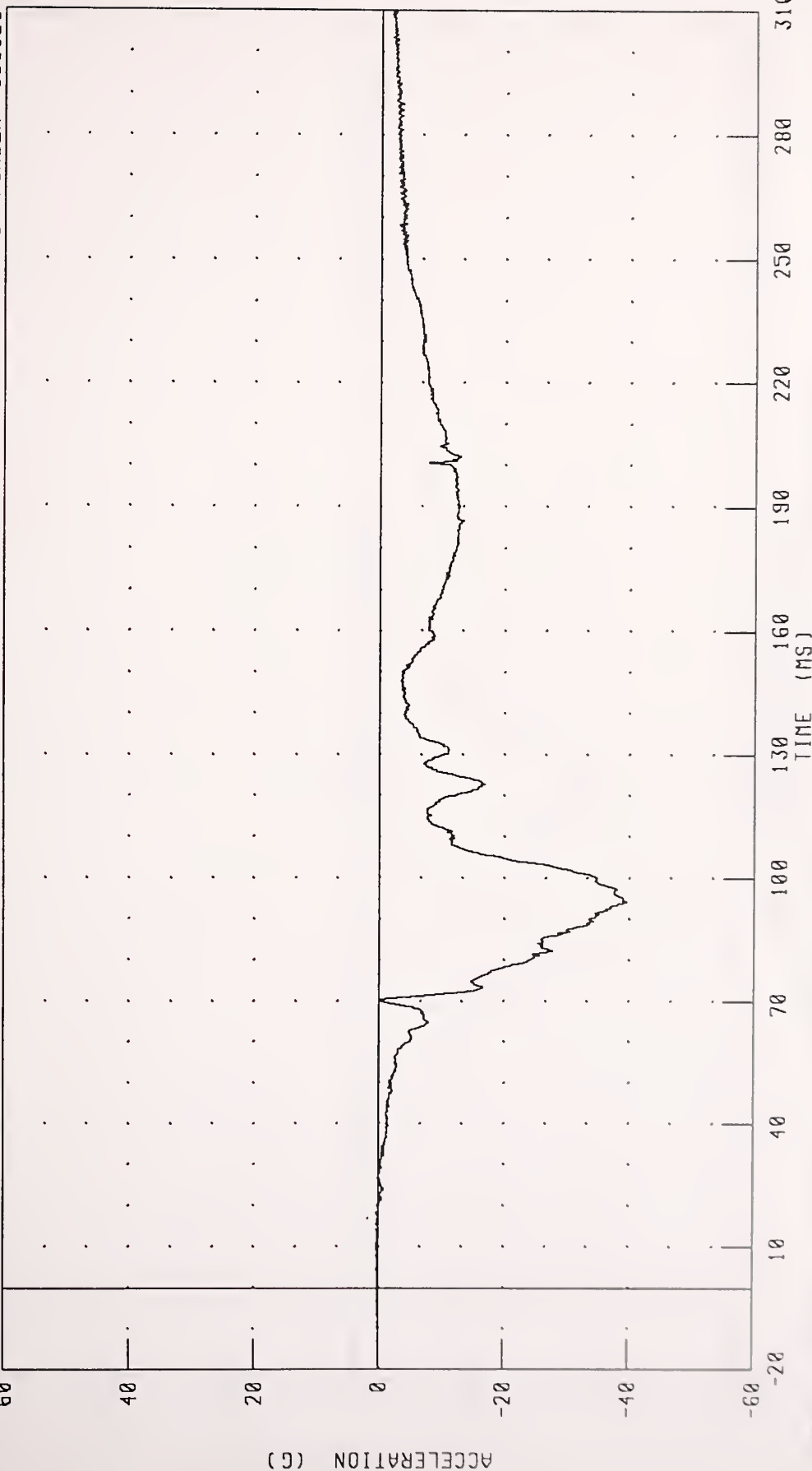
PEAK DATA: 5.42 G @ 253.84 MS, -31.30 G @ 126.64 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL HEDZG1 FILTER CH CLASS 1000

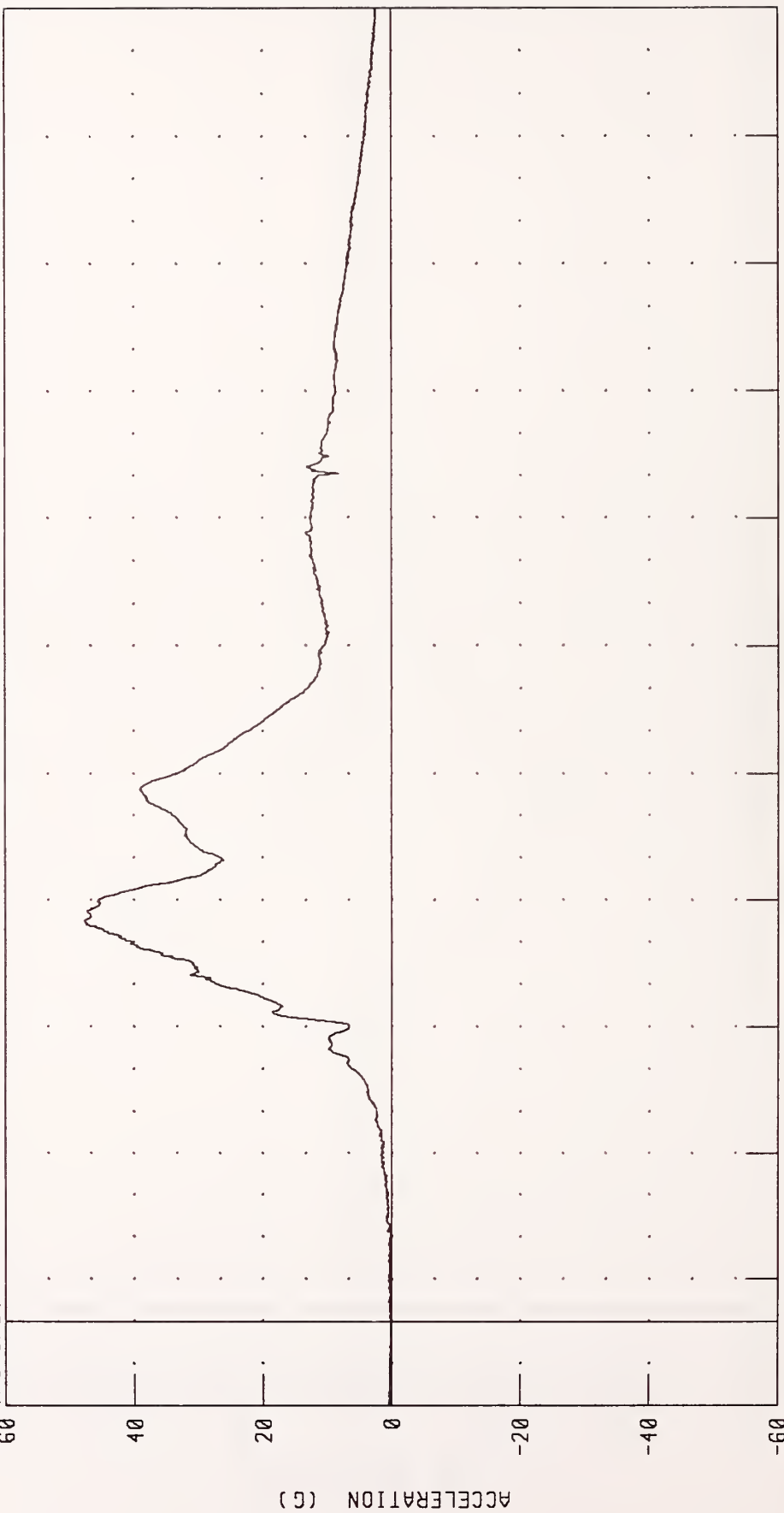
PEAK DATA: 0 42 G @ 4 48 MS, -39 58 G @ 94 24 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

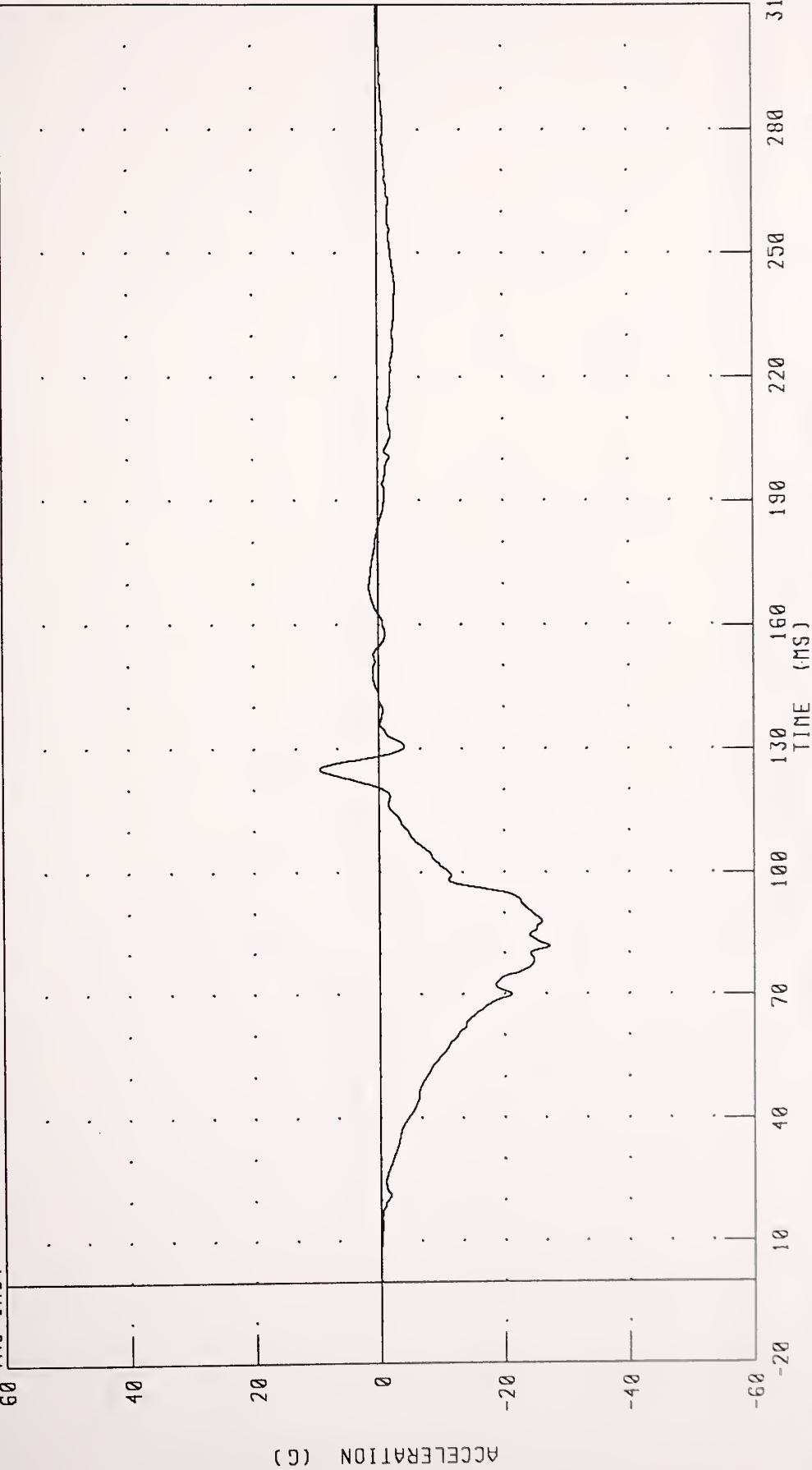
PEAK DATA 47 82 G @ 95 04 MS, 0 11 G @ -13 28 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



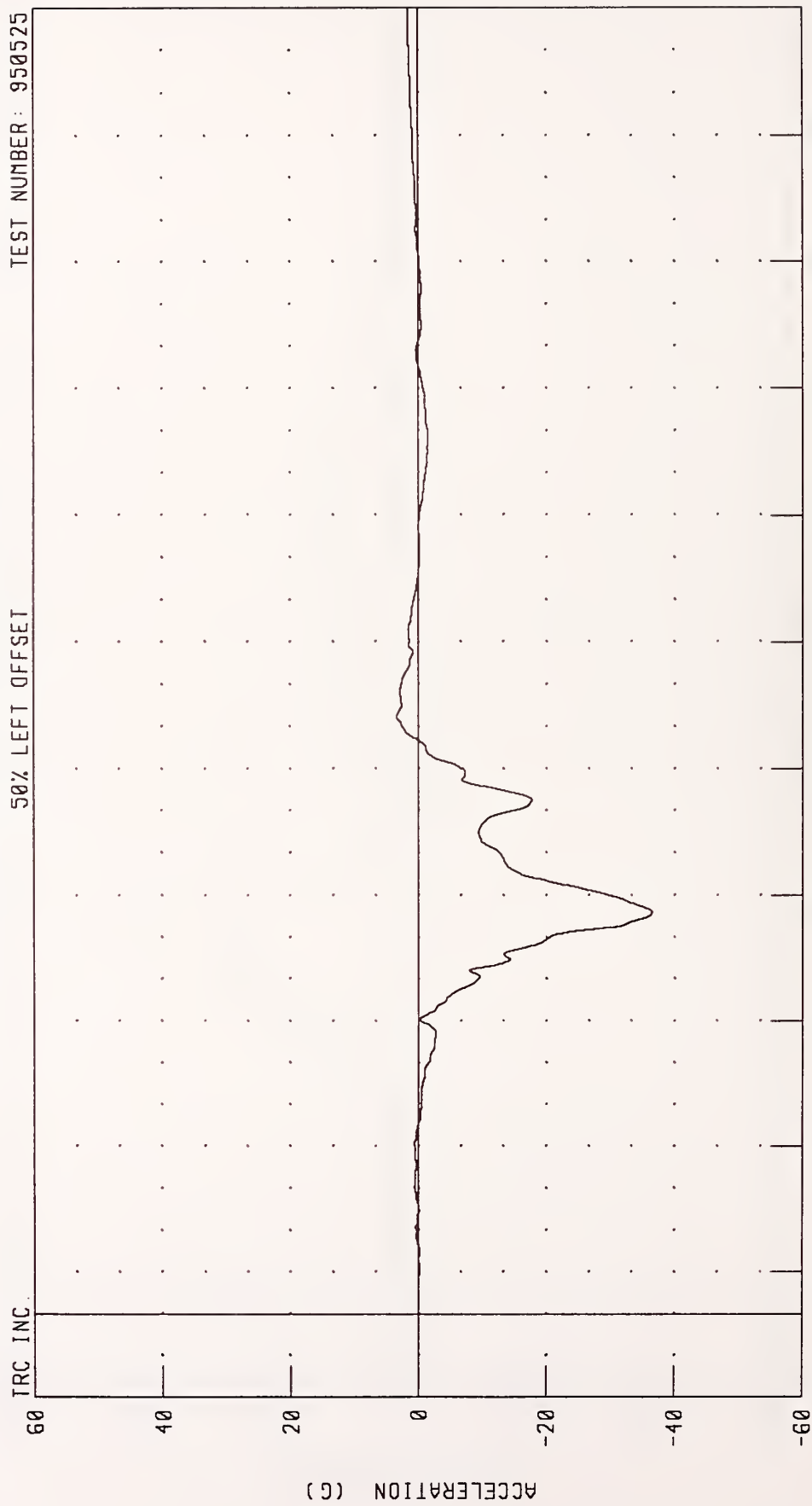
CHANNEL CSTXG1 FILTER CH CLASS 180

PEAK DATA: 9.53 G @ 125.12 MS; -27.32 G @ 82.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 3.38 G @ 142.24 MS, -36.49 G @ 96.00 MS

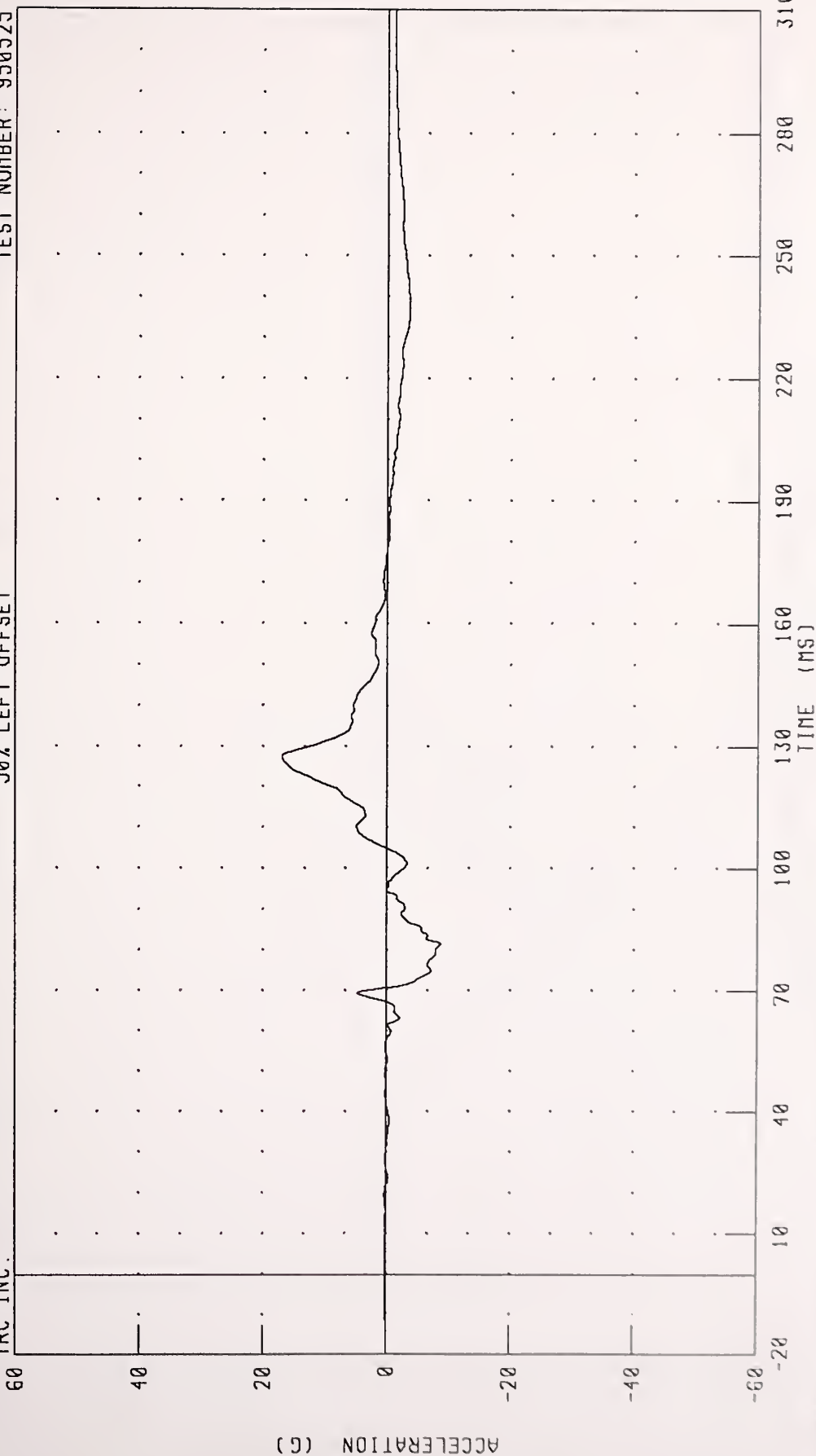


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL CST7C1 FILTER CH CLASS 180

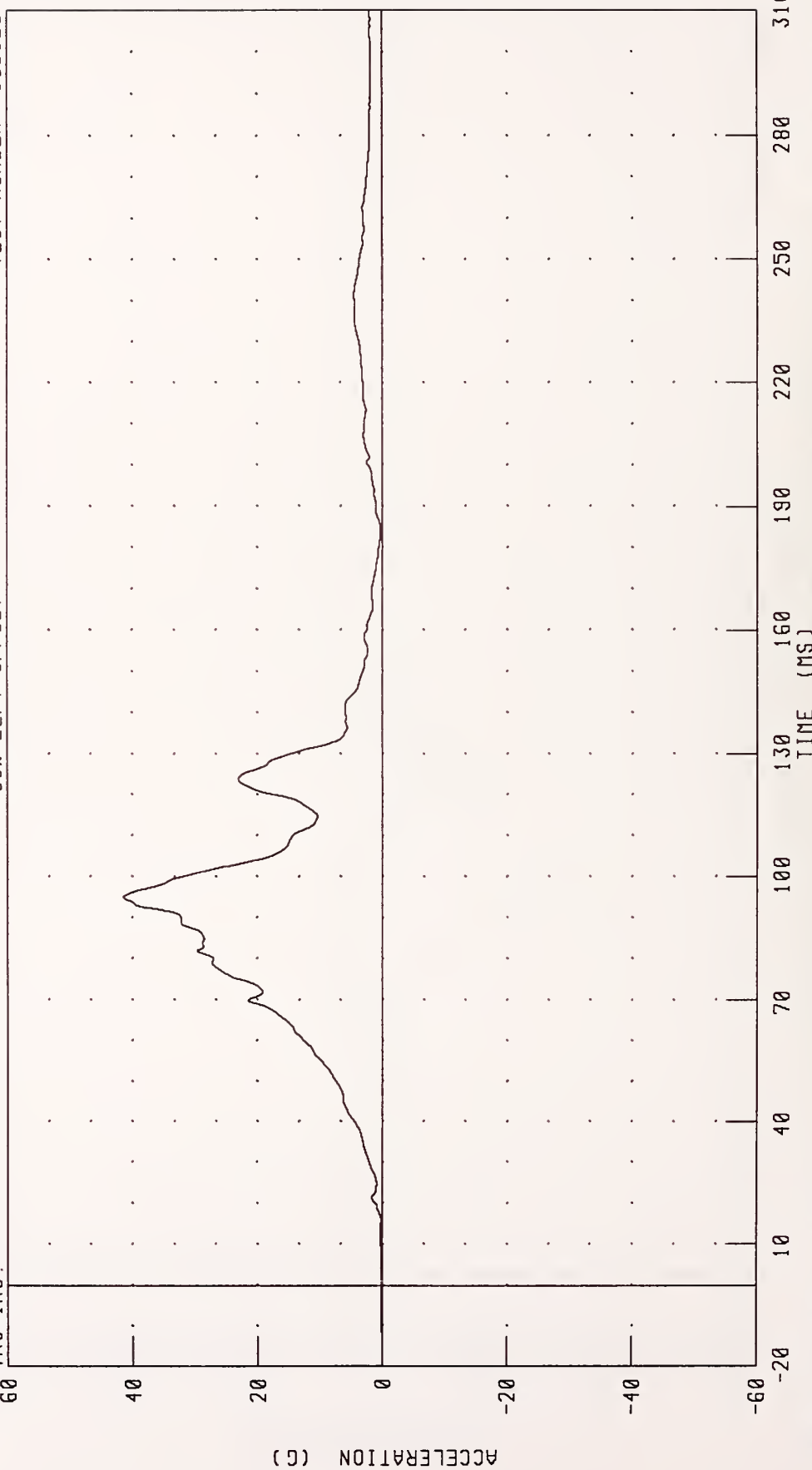
PEAK DATA 16 98 G @ 127 36 MS; -8 74 G @ 81 52 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: CSTRG1 FILTER: CH CLASS 180

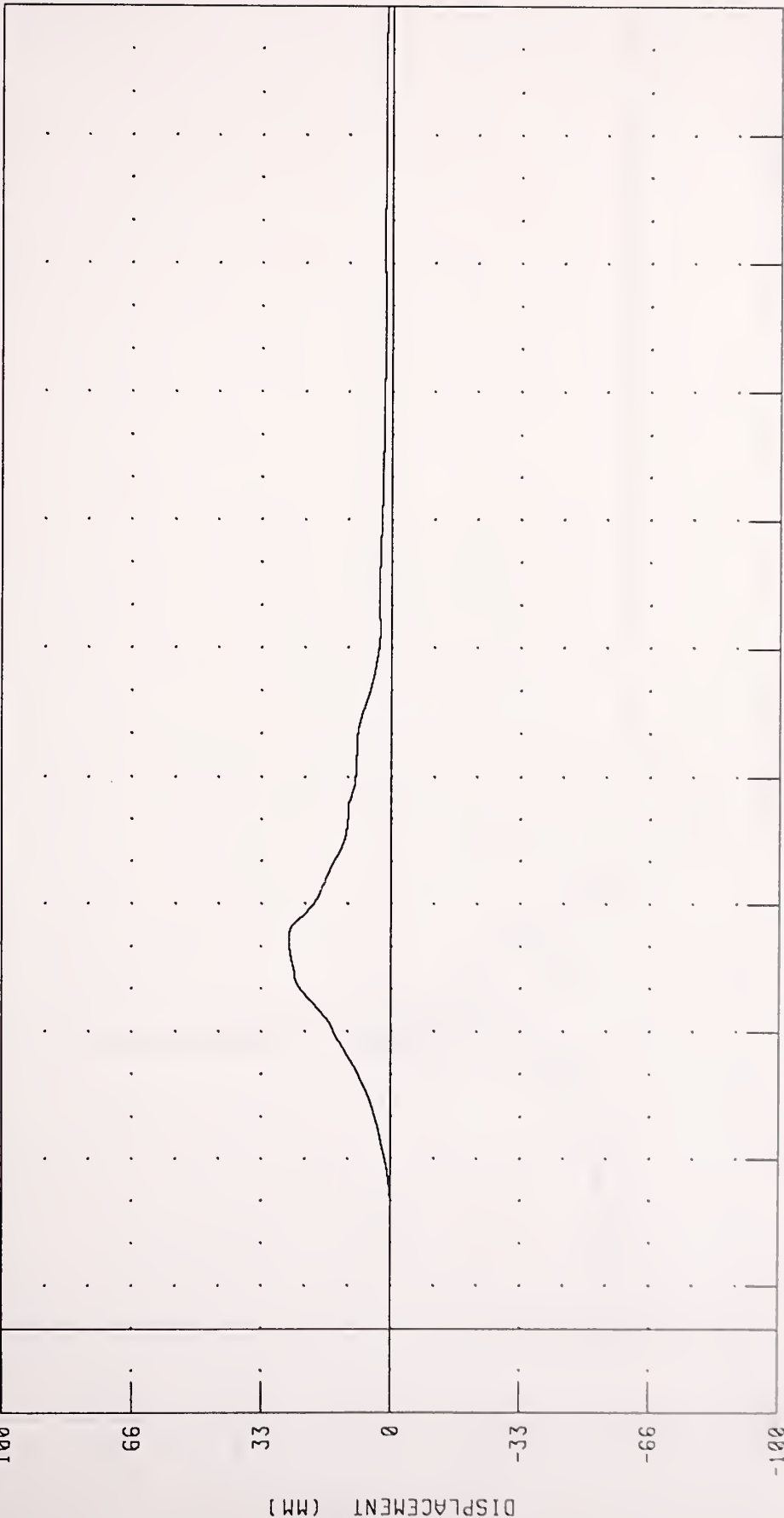
PEAK DATA: 41.42 G @ 94 96 MS, 0 00 G @ -20 00 MS

# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER DRIVER CHEST DEFLECTION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL CSTX01 FILTER CH CLASS 180

TIME (MS)

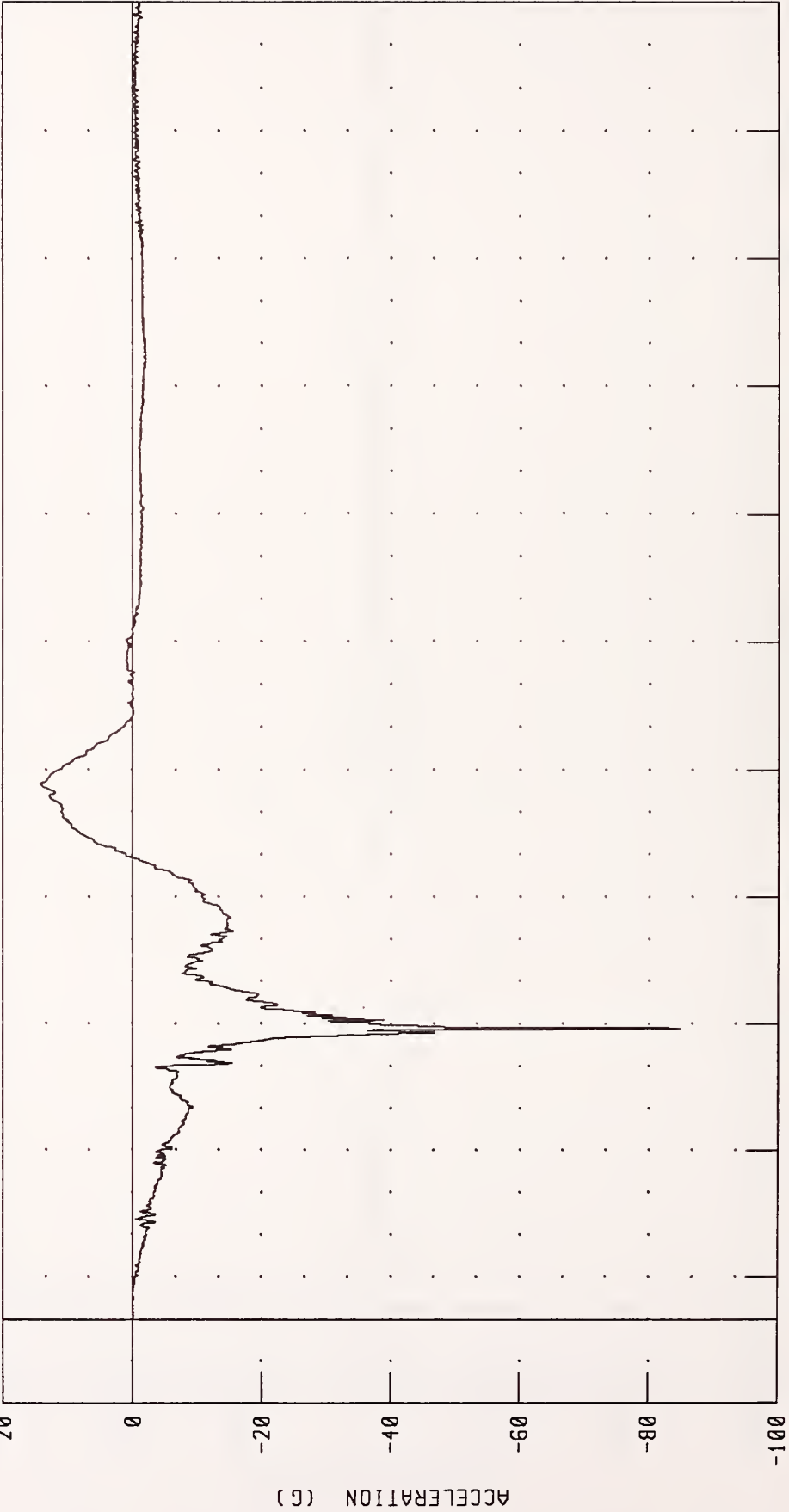
PEAK DATA 26.31 MM @ 91.12 MS, -0.02 NM @ -6.08 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



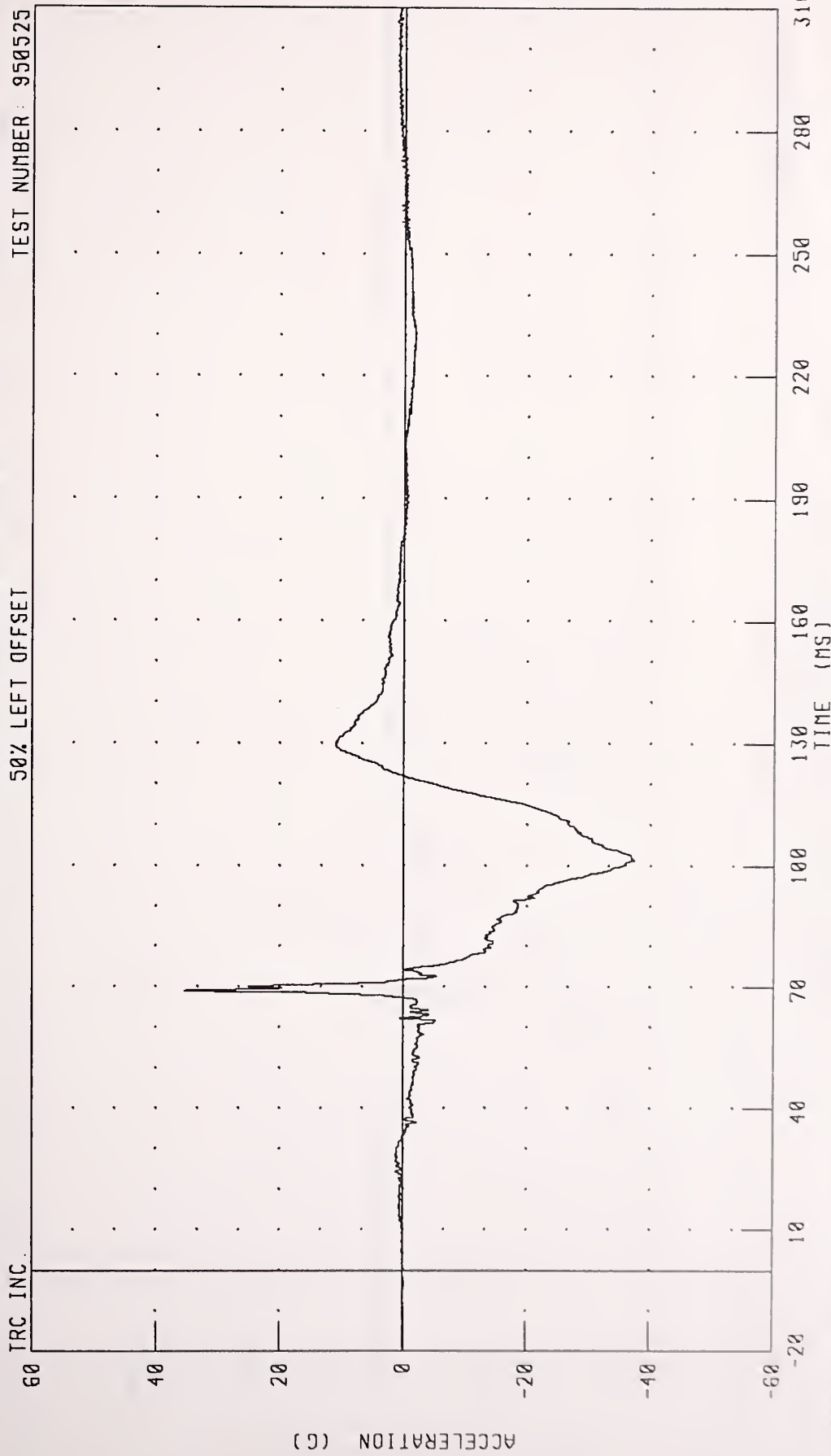
CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

PEAK DATA: 14.22 G @ 126.56 MS, -84.78 G @ 68.96 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 DRIVER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL PEVYG1 FILTER CH CLASS 1000

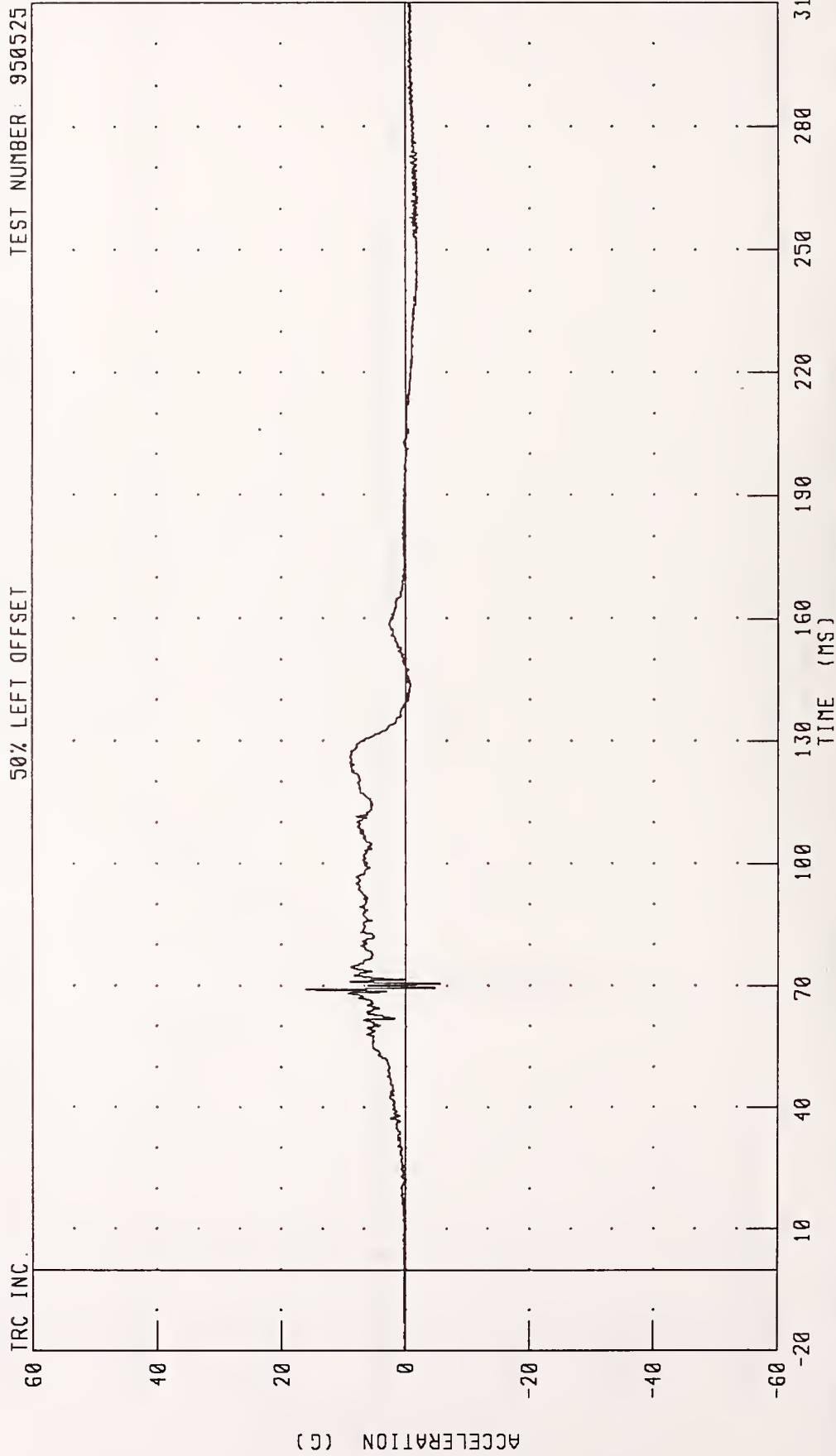
PEAK DATA: 35 34 G @ 68 96 MS, -37 41 G @ 101 28 MS



1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 950525

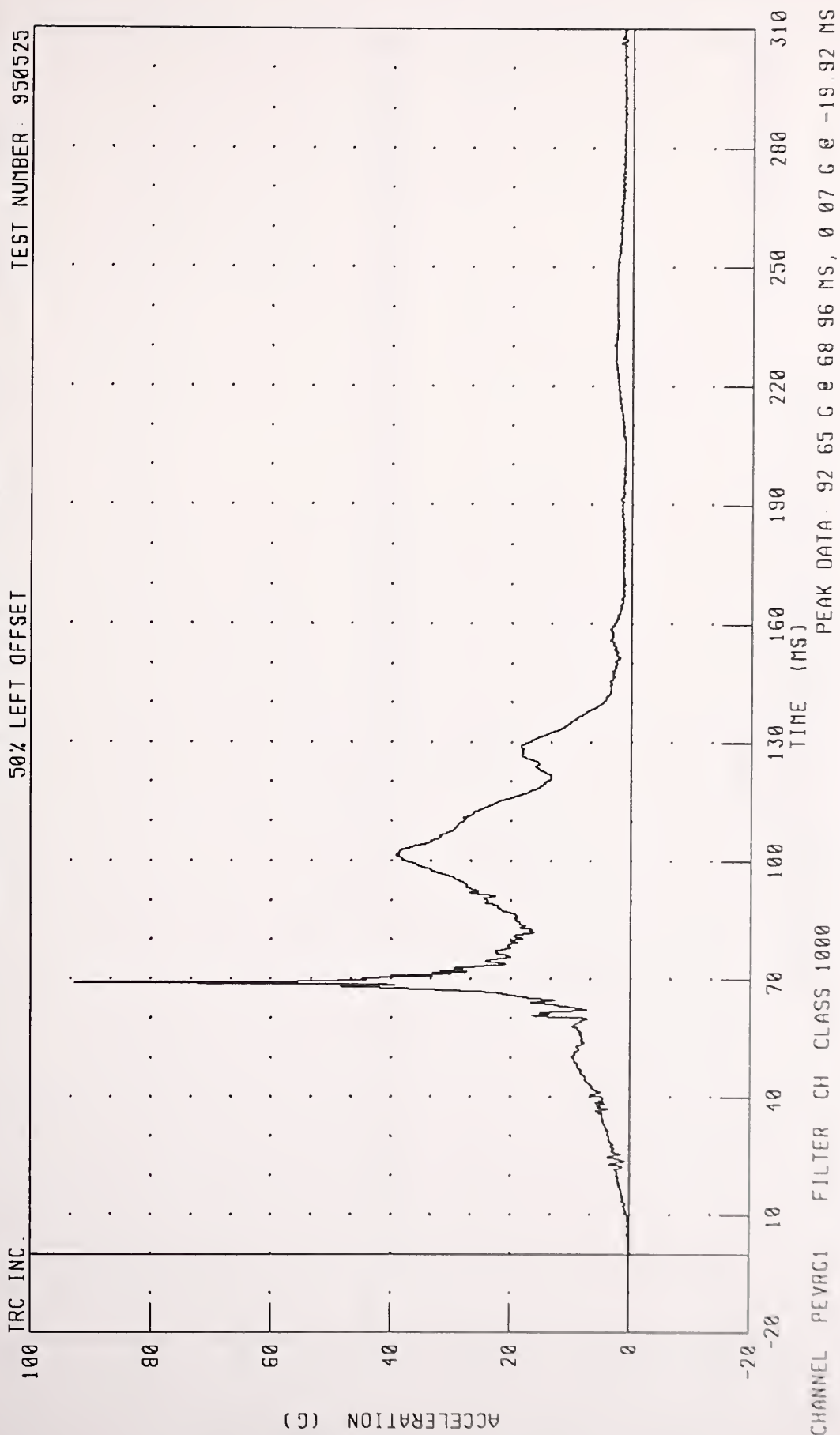
50% LEFT OFFSET



CHANNEL: PEVZG1 FILTER: CH CLASS 1000

PEAK DATA: 16.03 G @ 69.12 MS; -5.53 G @ 70.48 MS

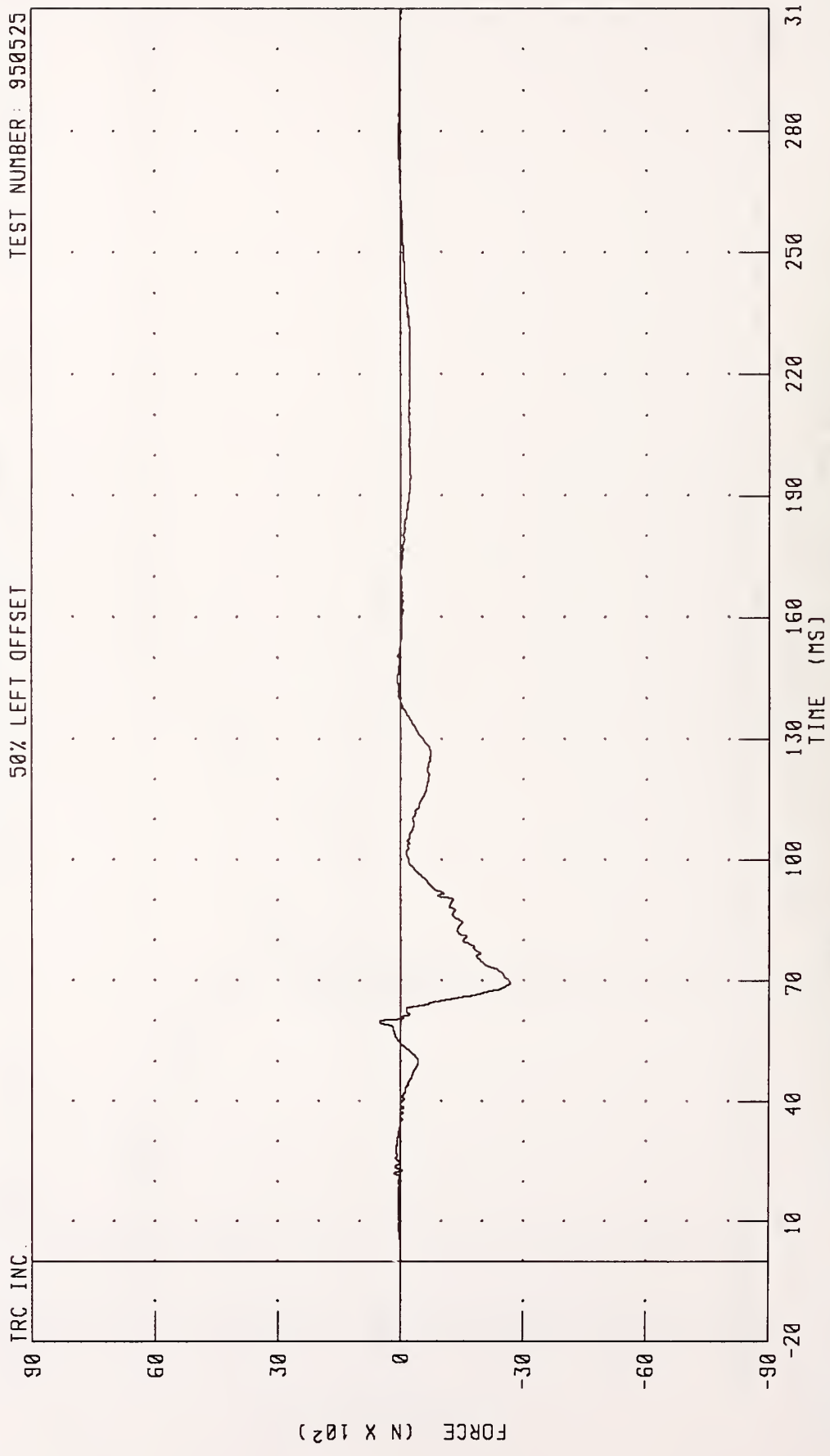
1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER PELVIS RESULTANT ACCELERATION



1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER LEFT FEMUR FORCE

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: LFMF1 FILTER: CH CLASS 600

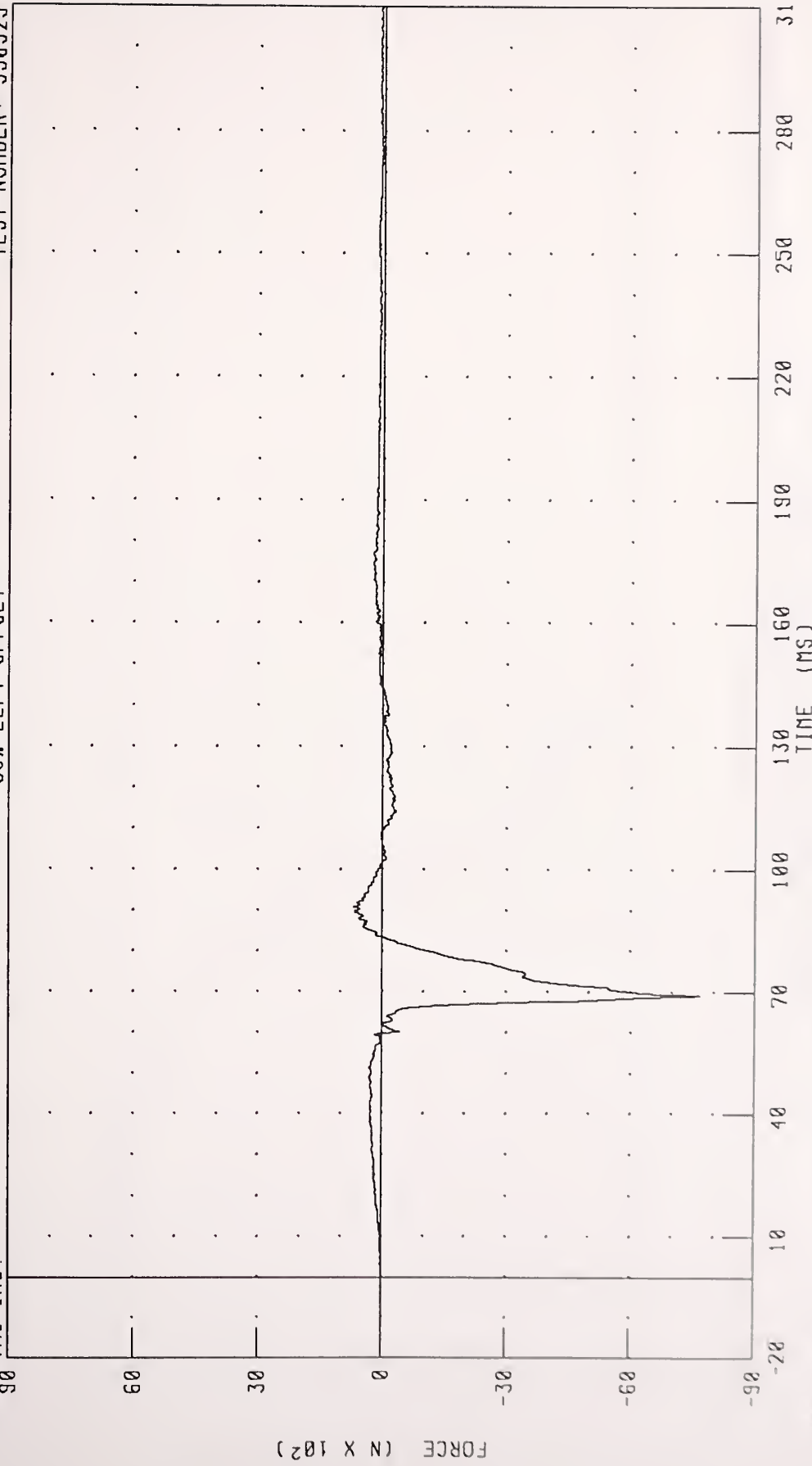
PEAK DATA: 513.09 N @ 59.76 MS, -2687.31 N @ 69.44 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 DRIVER RIGHT FEMUR FORCE

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



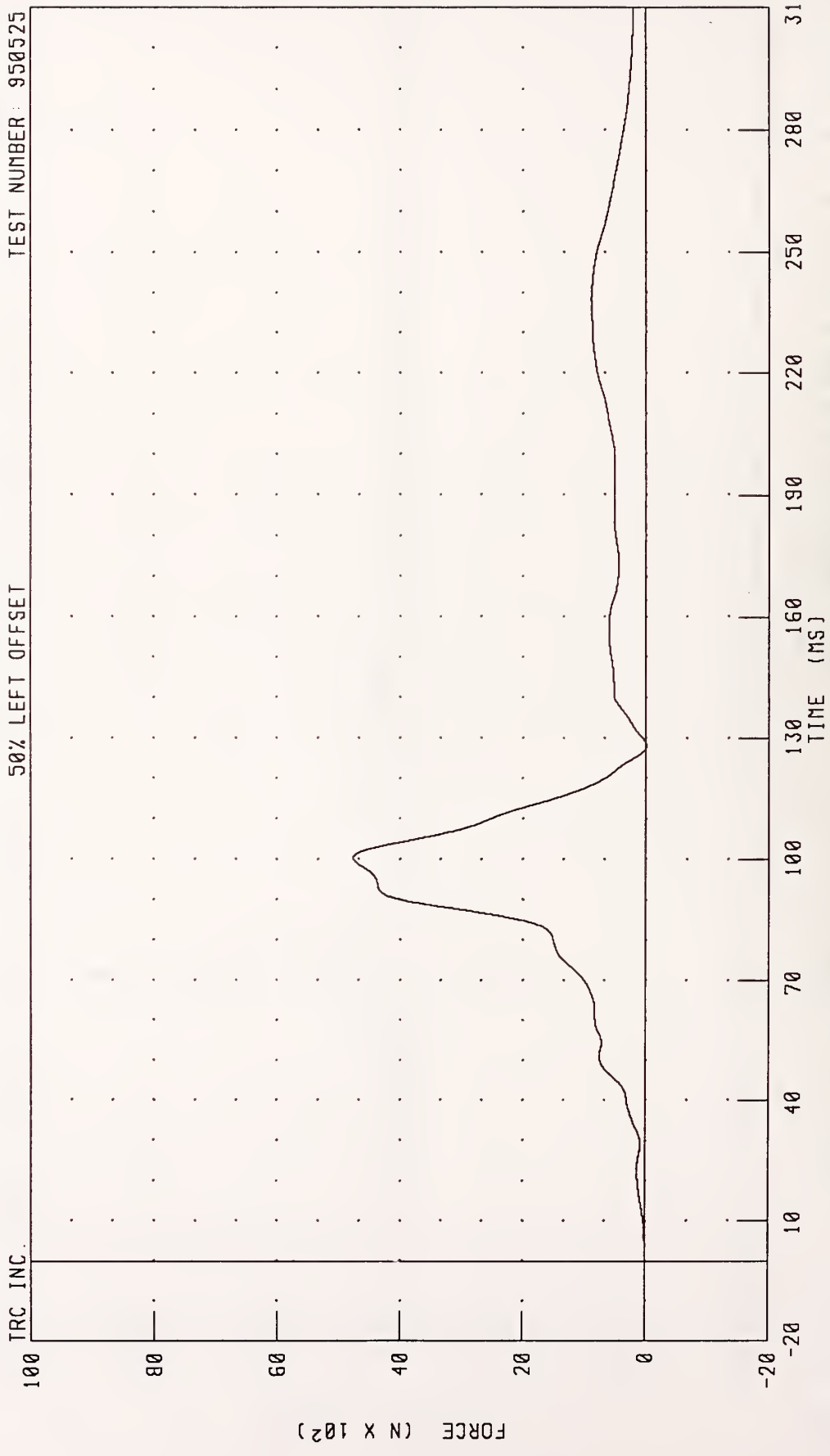
CHANNEL RFMF1 FILTER CH CLASS 600

PEAK DATA 682 08 N @ 90 96 MS, -7668 85 N @ 69 12 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER LAP BELT OUTBOARD FORCE

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: LBOF1 FILTER: CH. CLASS 60

PEAK DATA: 4762.66 N @ 100.32 MS; -8.71 N @ 128.08 MS

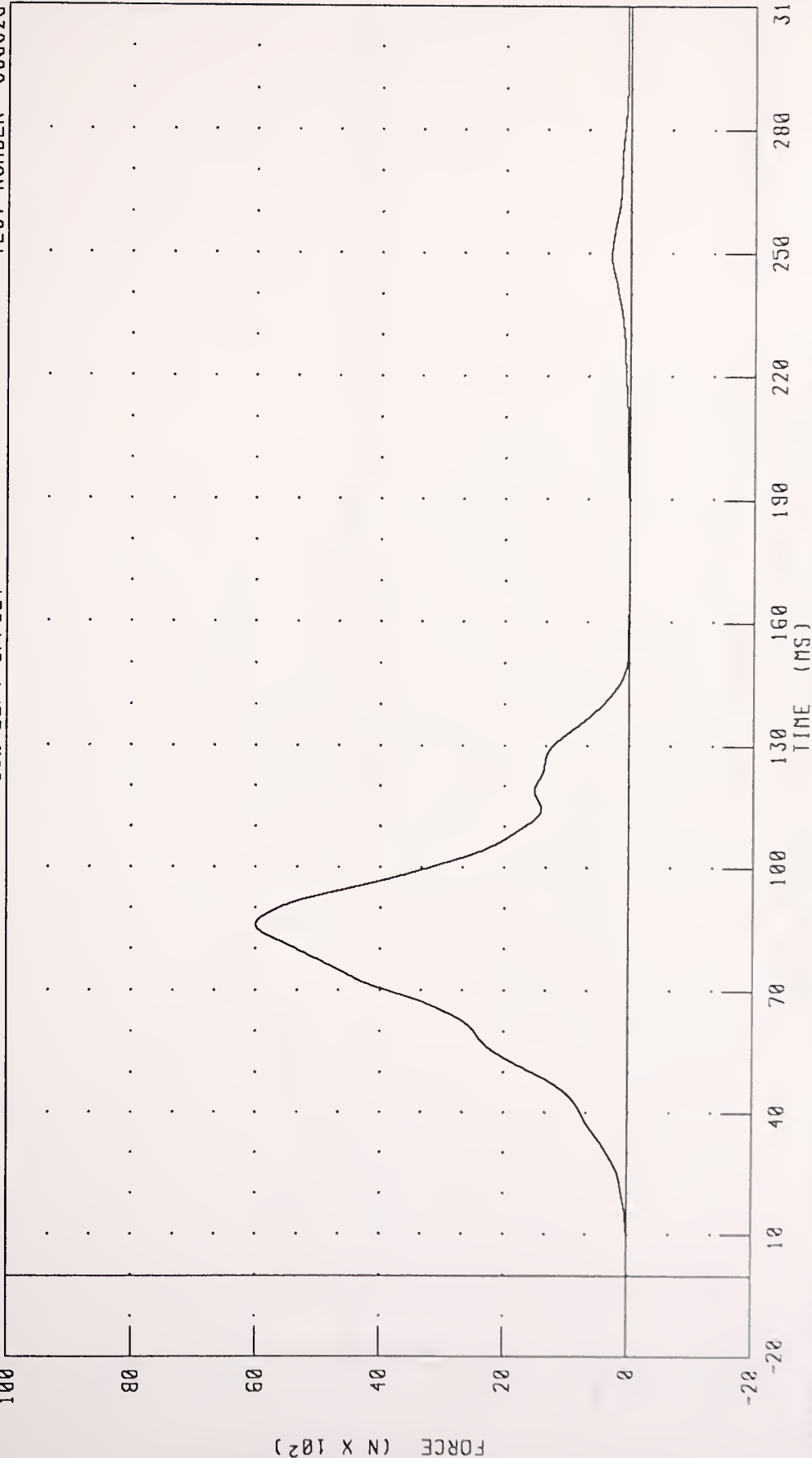


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
DRIVER SHOULDER BELT FORCE

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



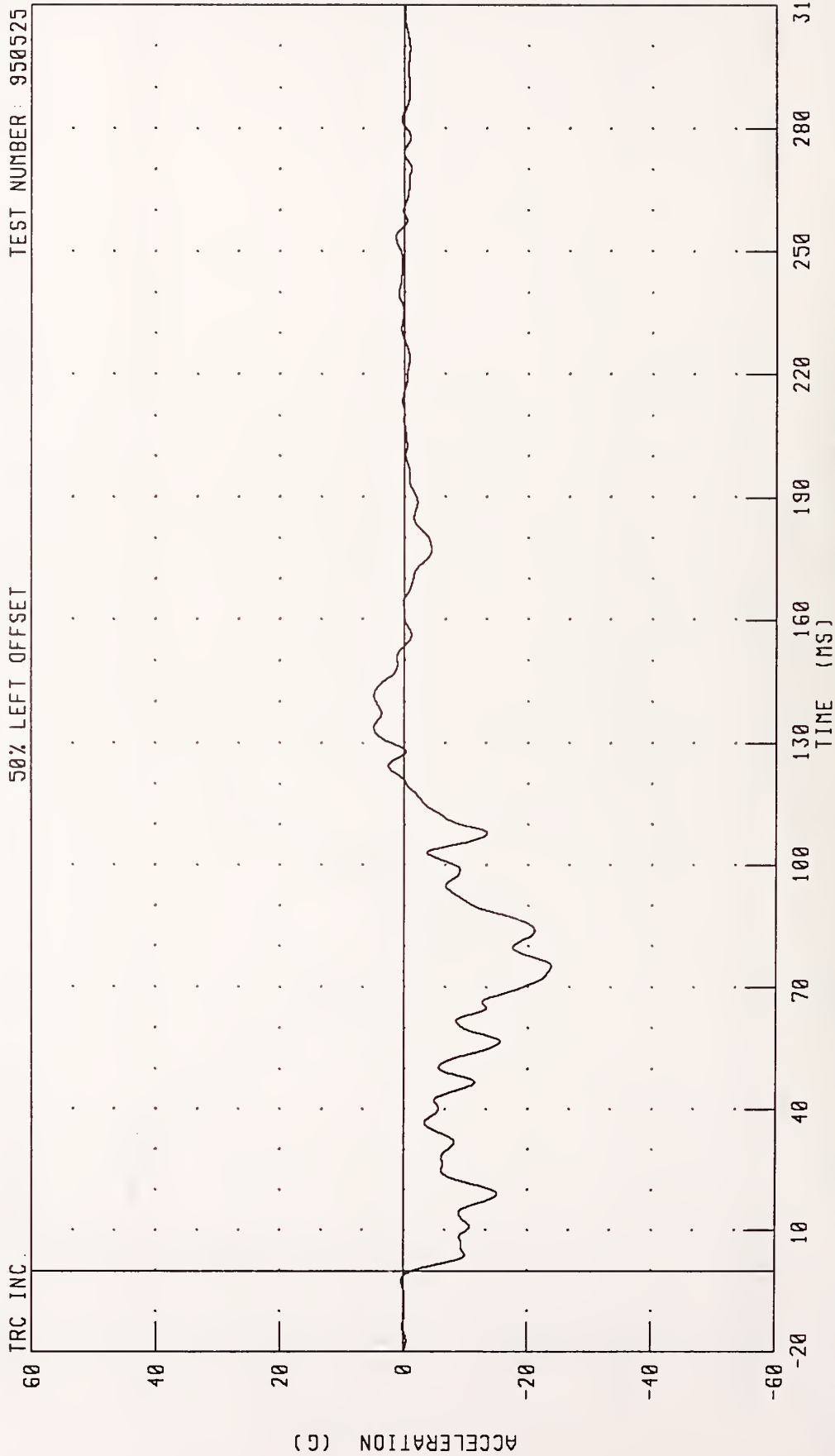
CHANNEL SH8FI FILTER CH CLASS 60

PEAK DATA 5999 16 N @ 86 00 MS, -3 47 N @ -17 92 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: VCGXG1 FILTER: CH. CLASS 60

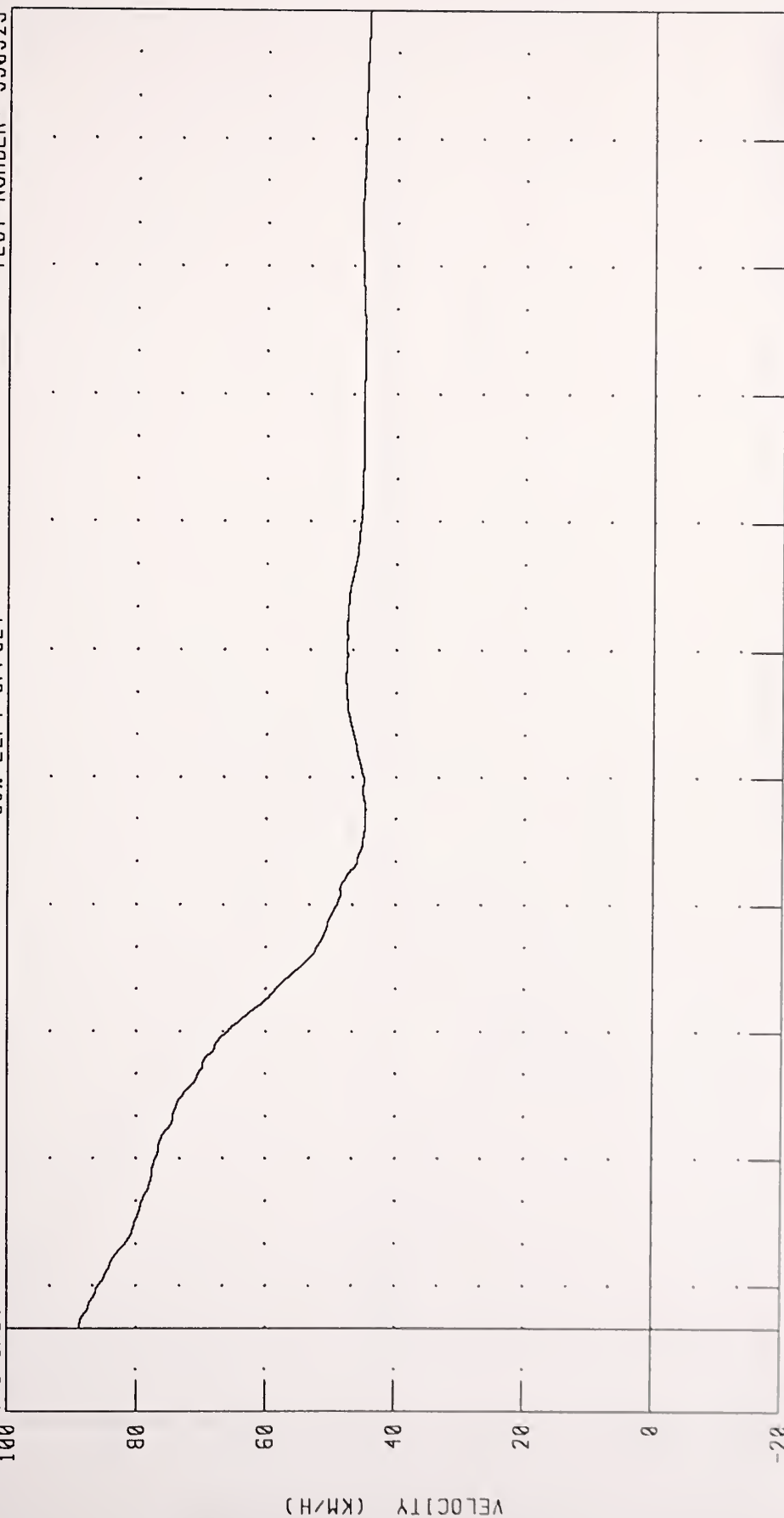
PEAK DATA: 4.90 G @ 133.84 MS, -23.78 G @ 75.20 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY X-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL VCGXV1 FILTER CH CLASS 180

TIME (MS)

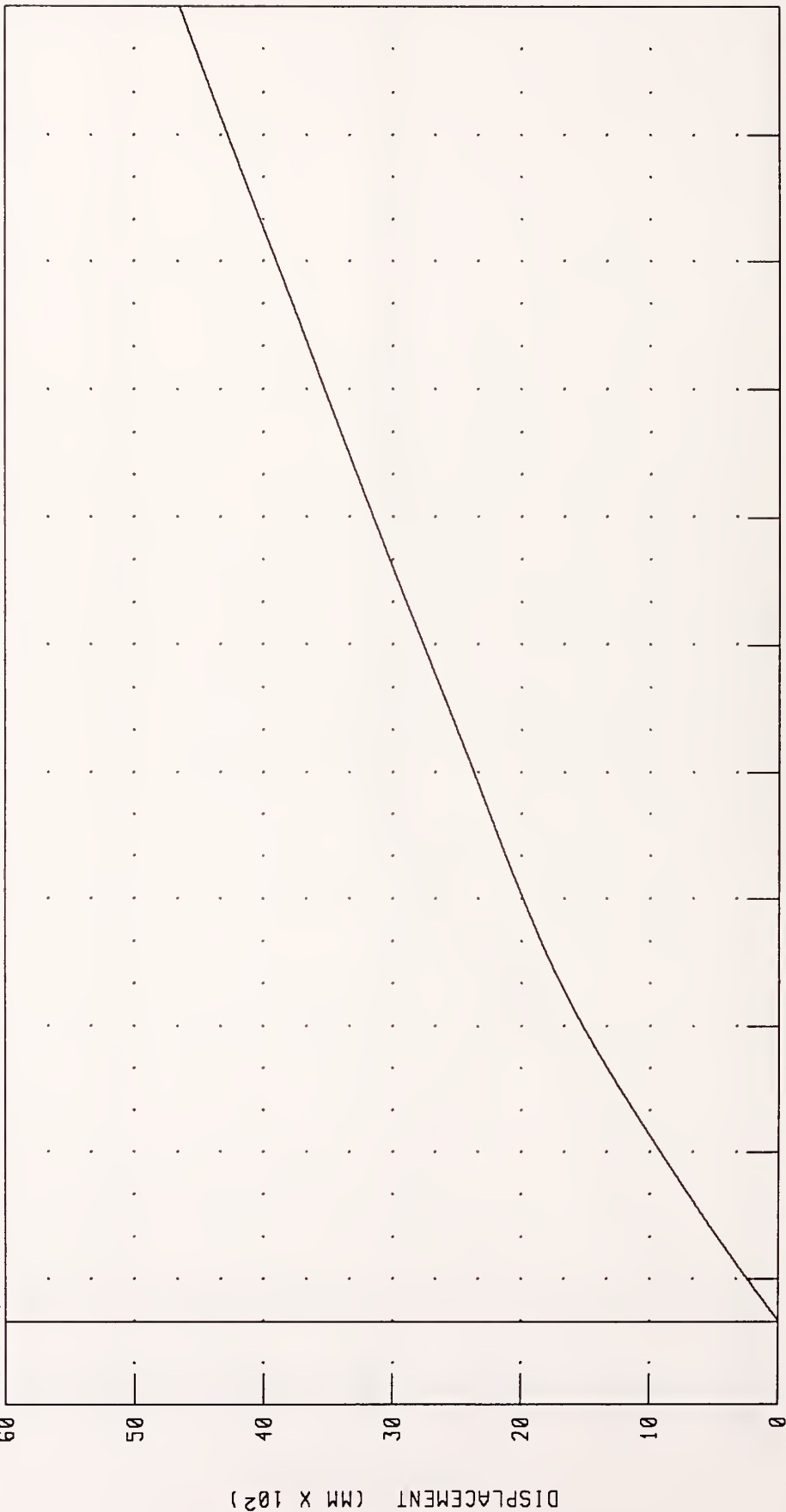
PEAK DATA 88 70 KM/H @ 0 00 MS, 44 45 KM/H @ 310 00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY X-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: VCGXD1 FILTER: CH. CLASS 180

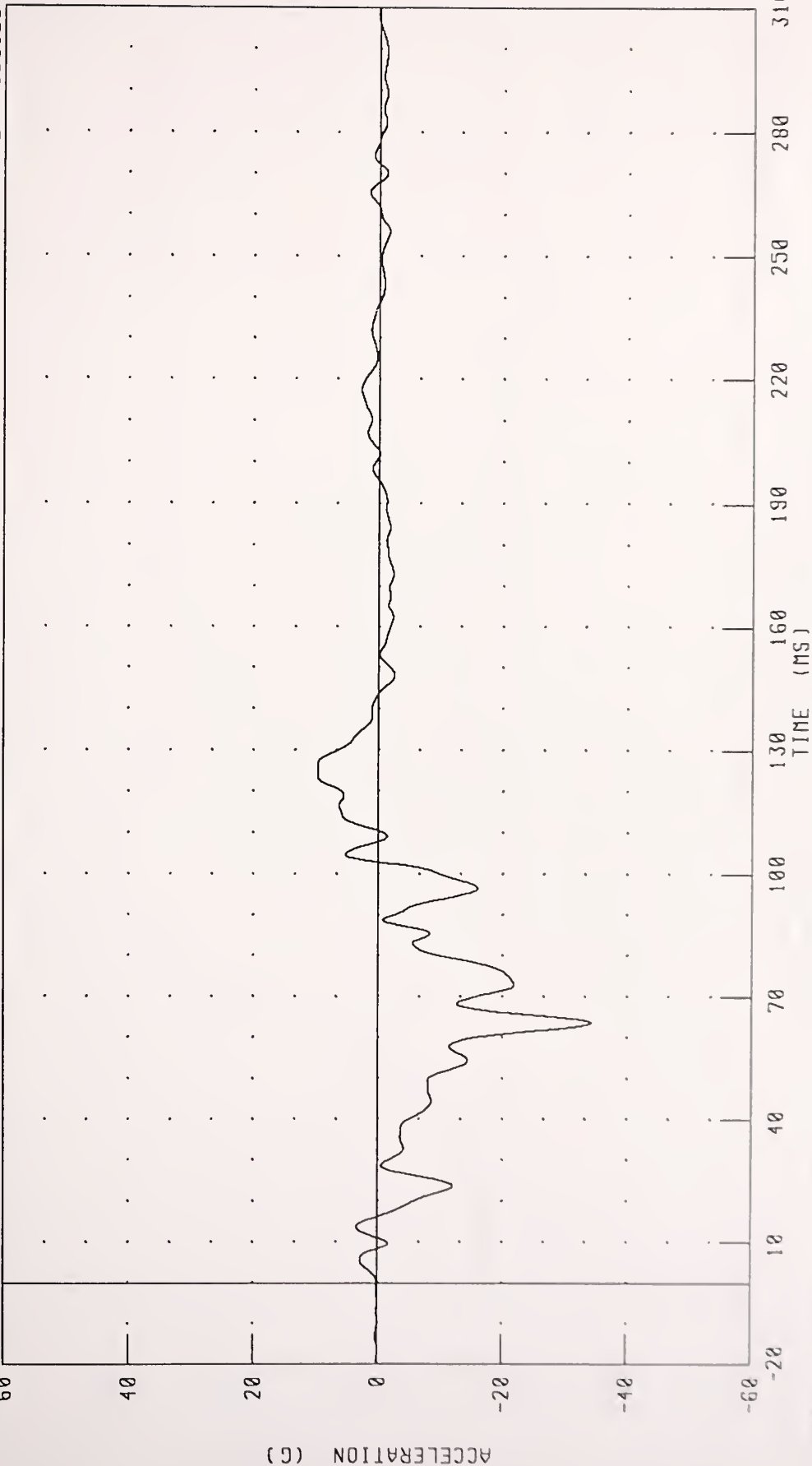
PEAK DATA: 4650.91 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL VCCY01 FILTER CH CLASS 60

PEAK DATA 9 74 G @ 126 72 MS, -34 28 G @ 63 68 MS

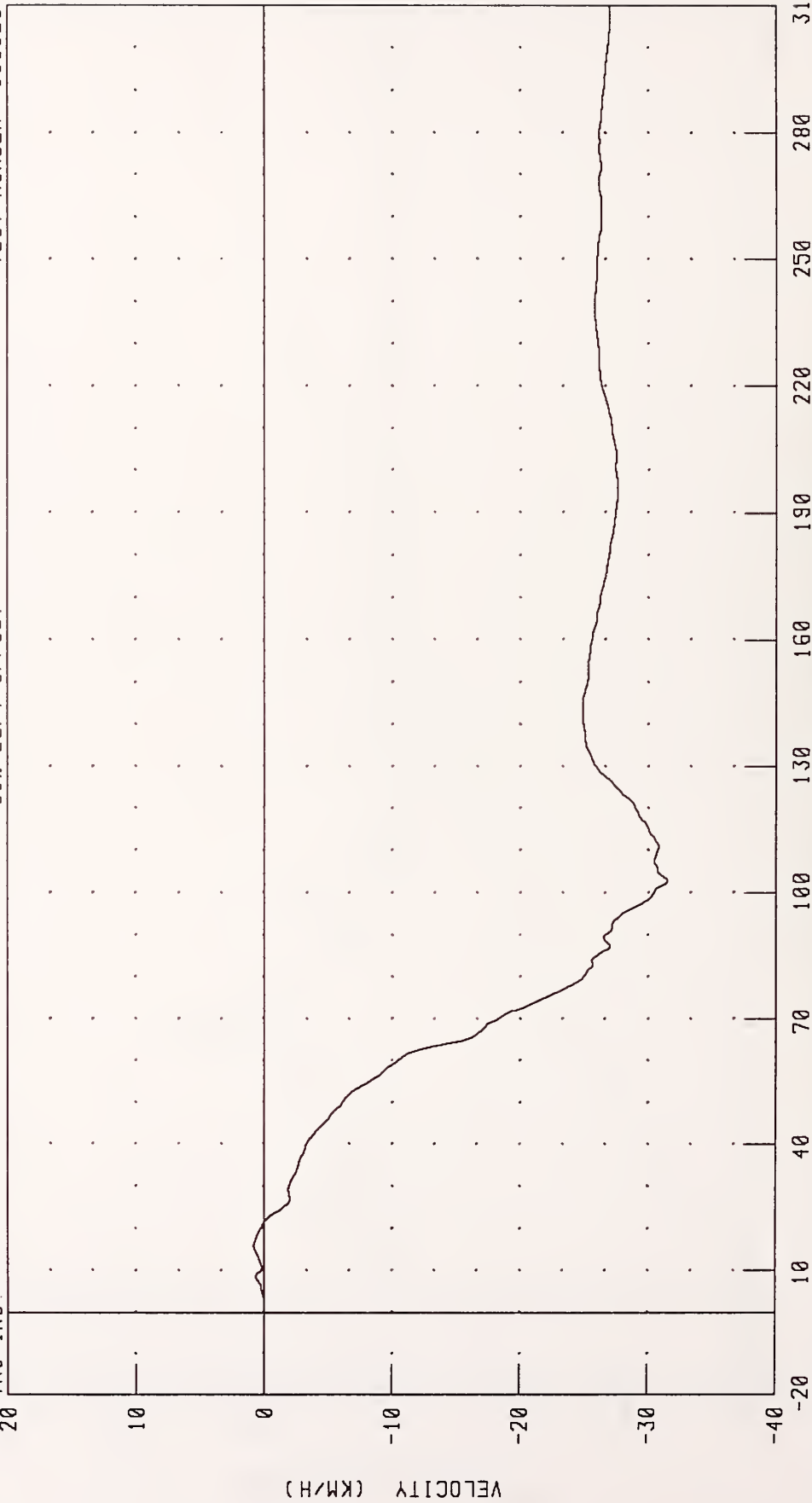


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY Y-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: VCGYV1 FILTER: CH. CLASS 180

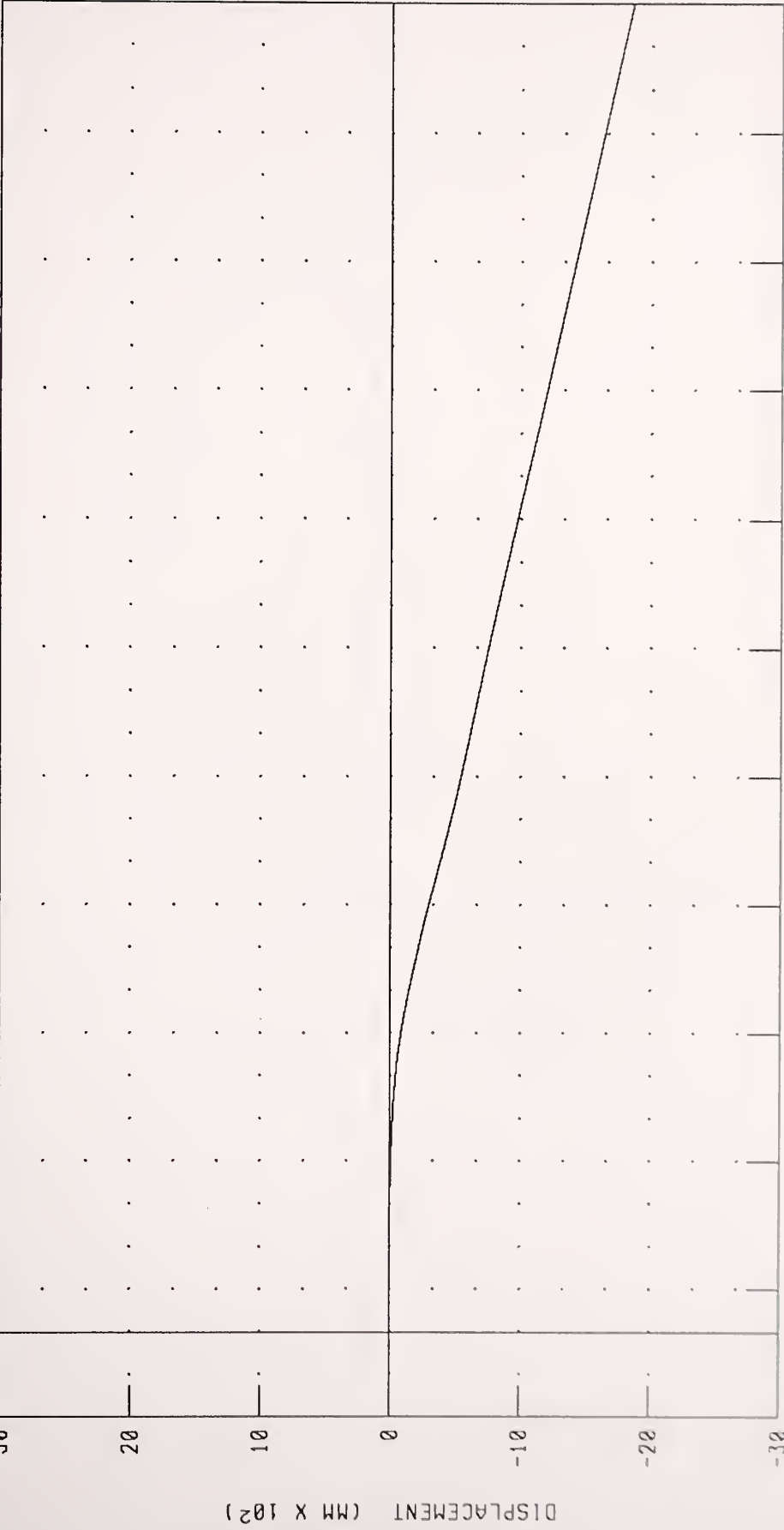
PEAK DATA: 0.81 KM/H @ 15.84 MS, -31.53 KM/H @ 102.72 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL VCCY01 FILTER CH CLASS 180

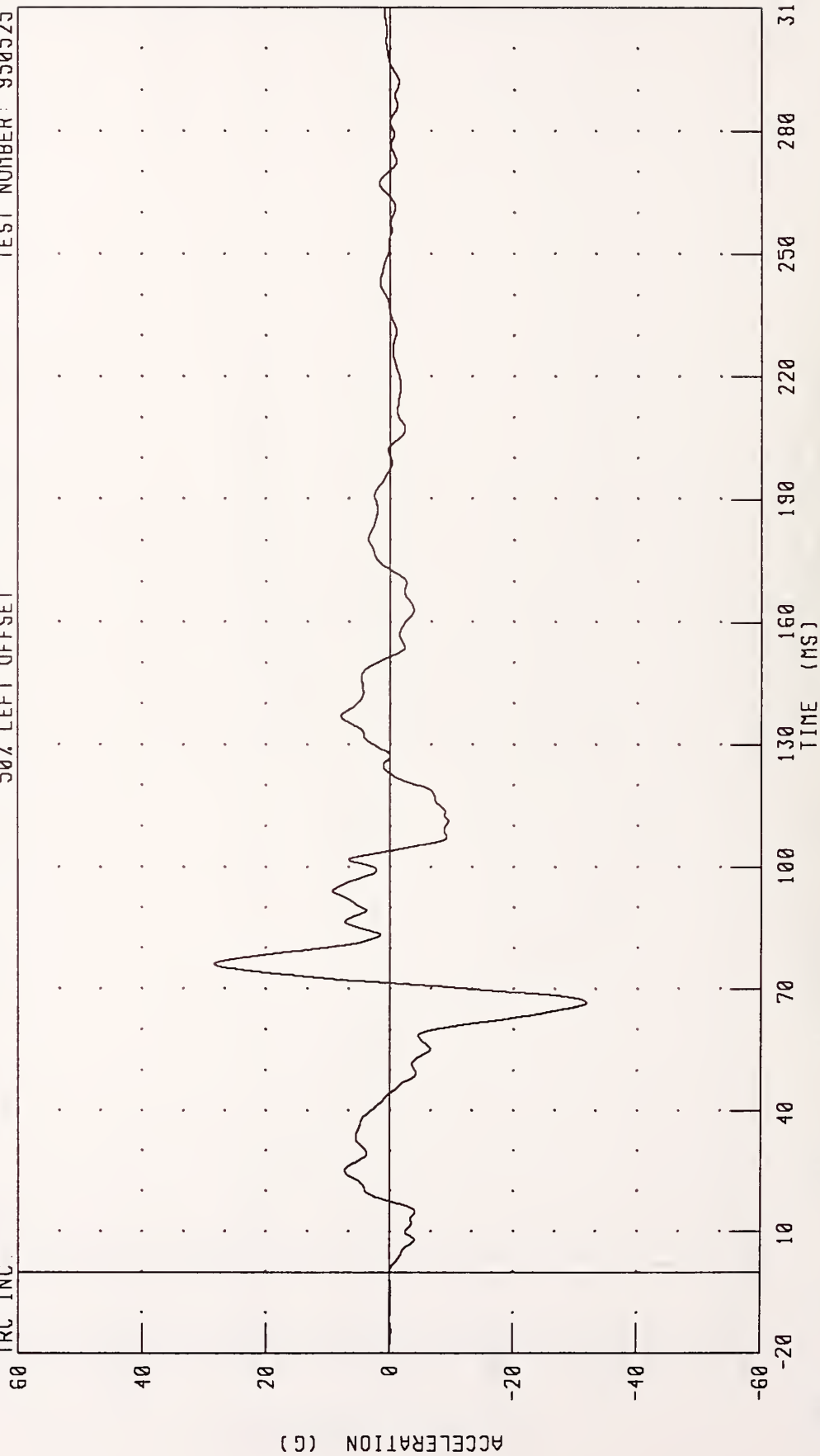
PEAK DATA: 2 09 MM @ 21 52 MS, -1858 72 MM @ 310 00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

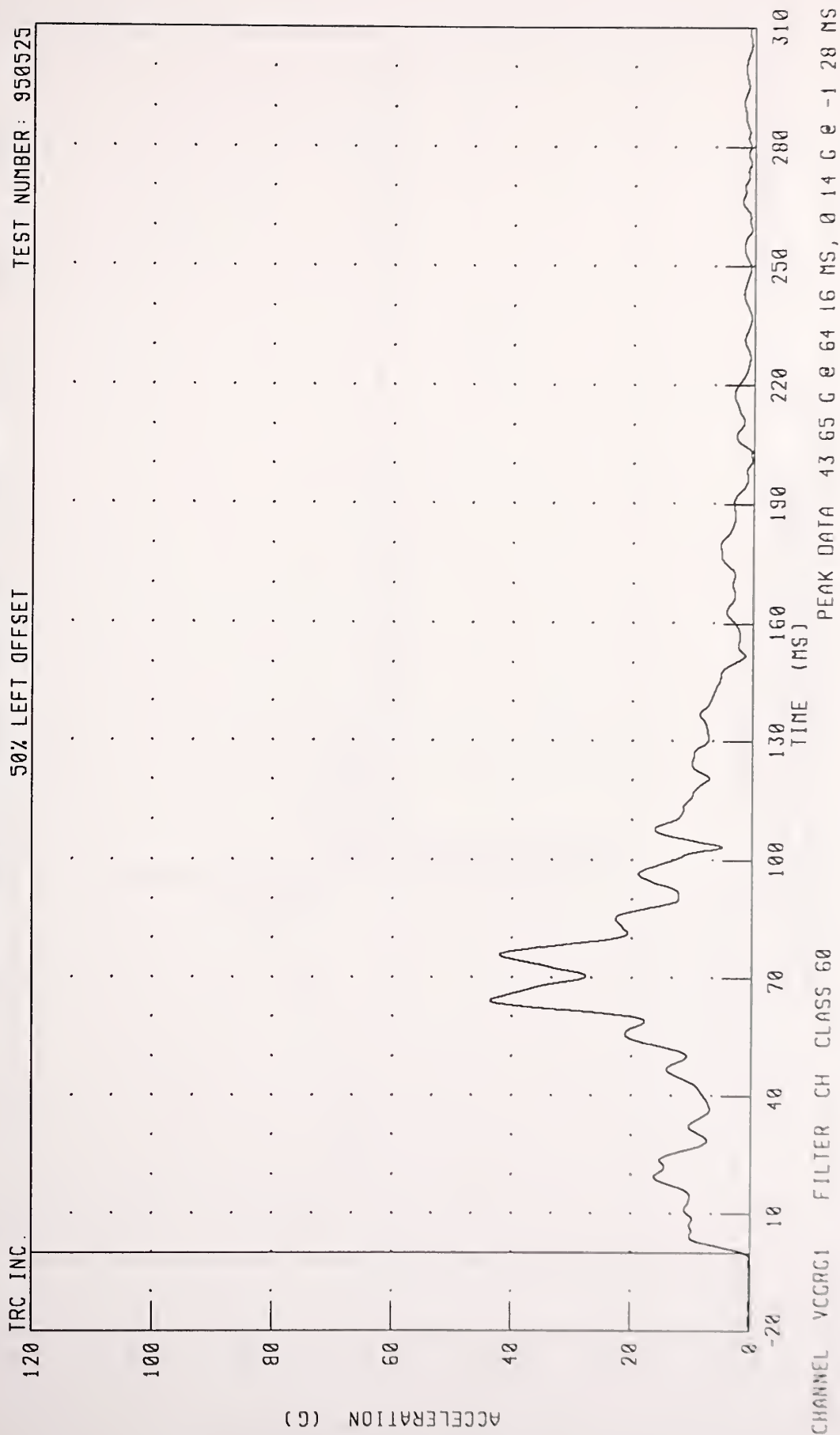
TRC INC.



CHANNEL: VCGZG1 FILTER: CH. CLASS 60

PEAK DATA: 28.41 G @ 76.16 MS, -31.75 G @ 66.56 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
CAR CENTER OF GRAVITY RESULTANT ACCELERATION

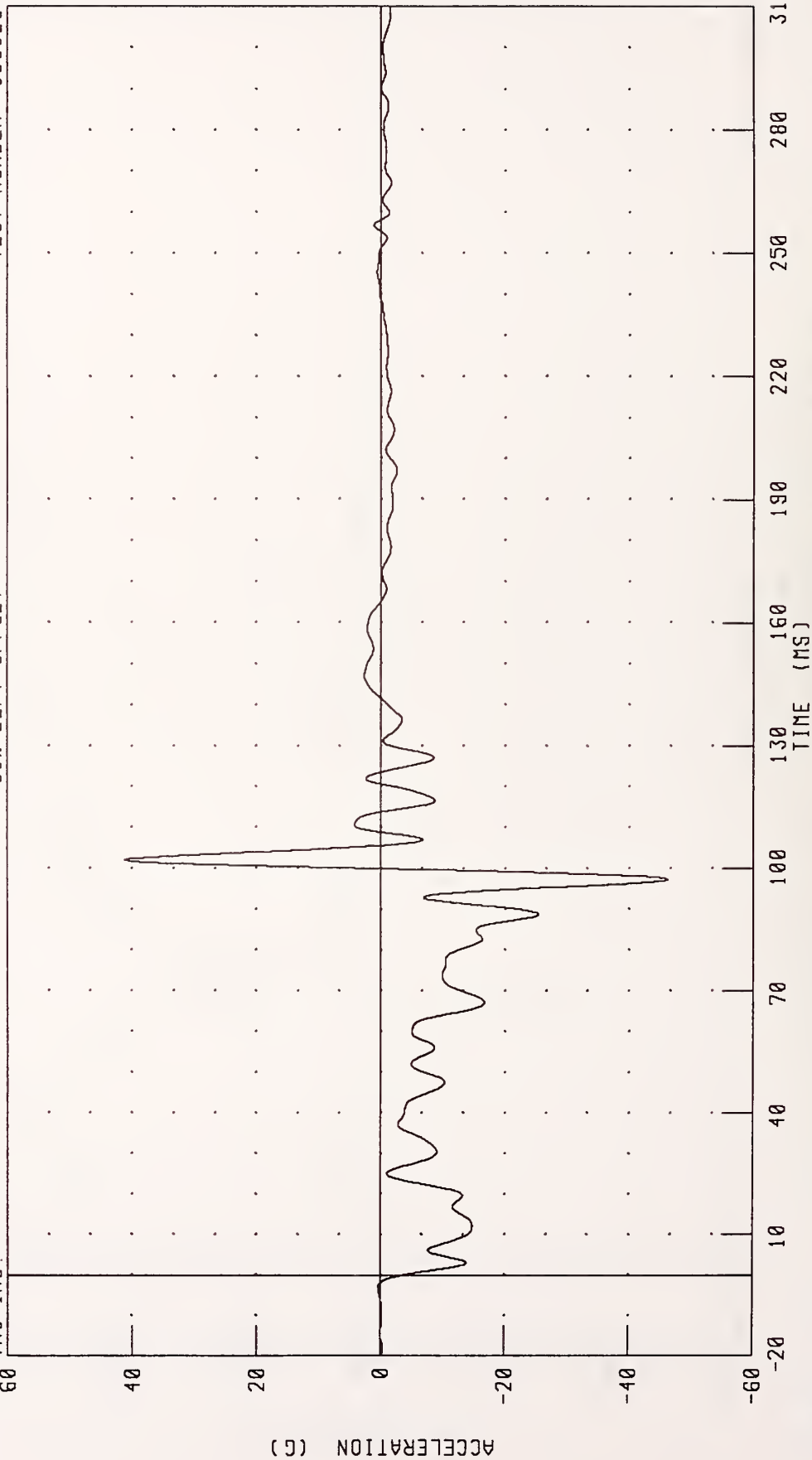


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: LFSXG1 FILTER: CH CLASS 60

PEAK DATA: 41.08 G @ 102.08 MS, -46.20 G @ 97.28 MS

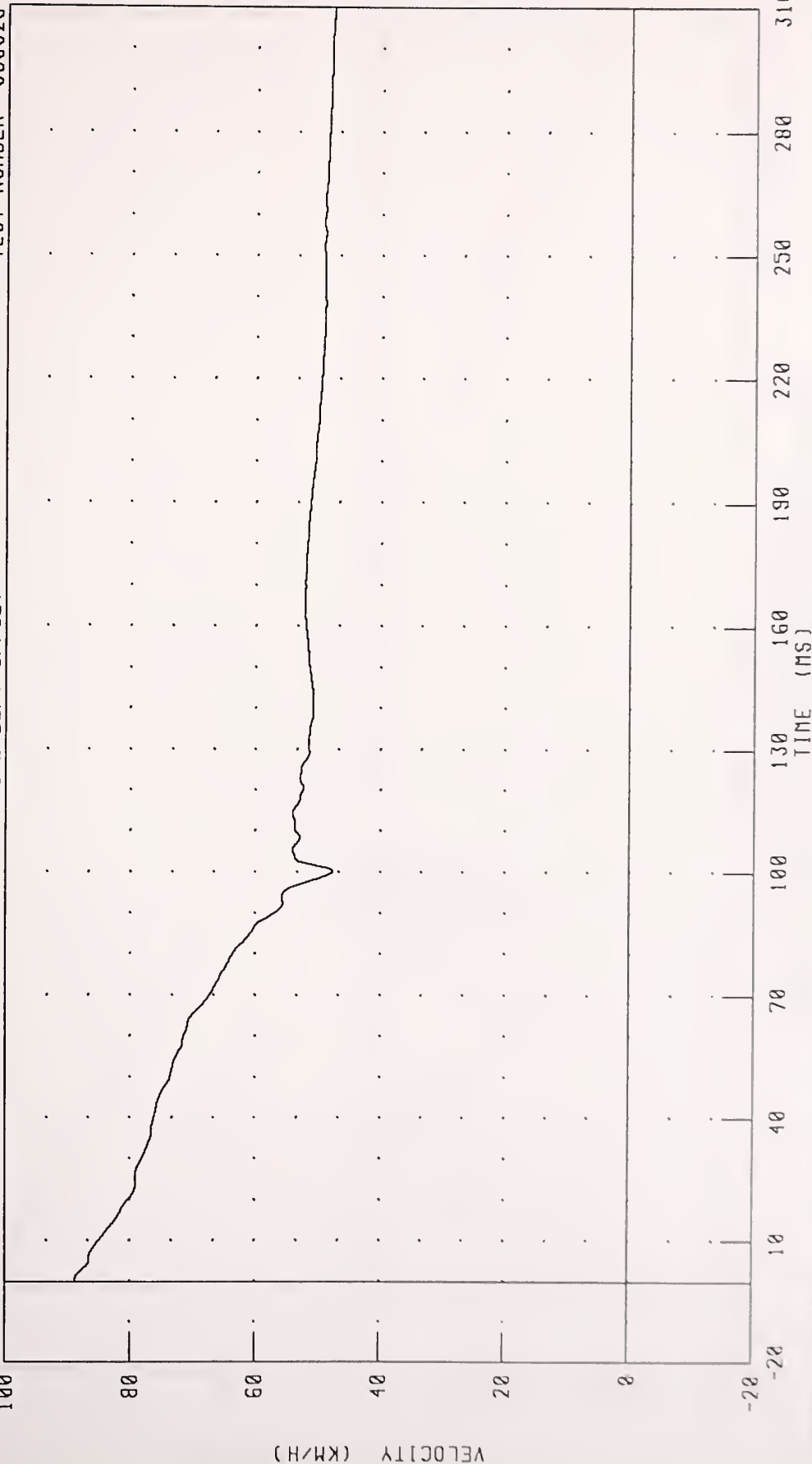


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL X-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

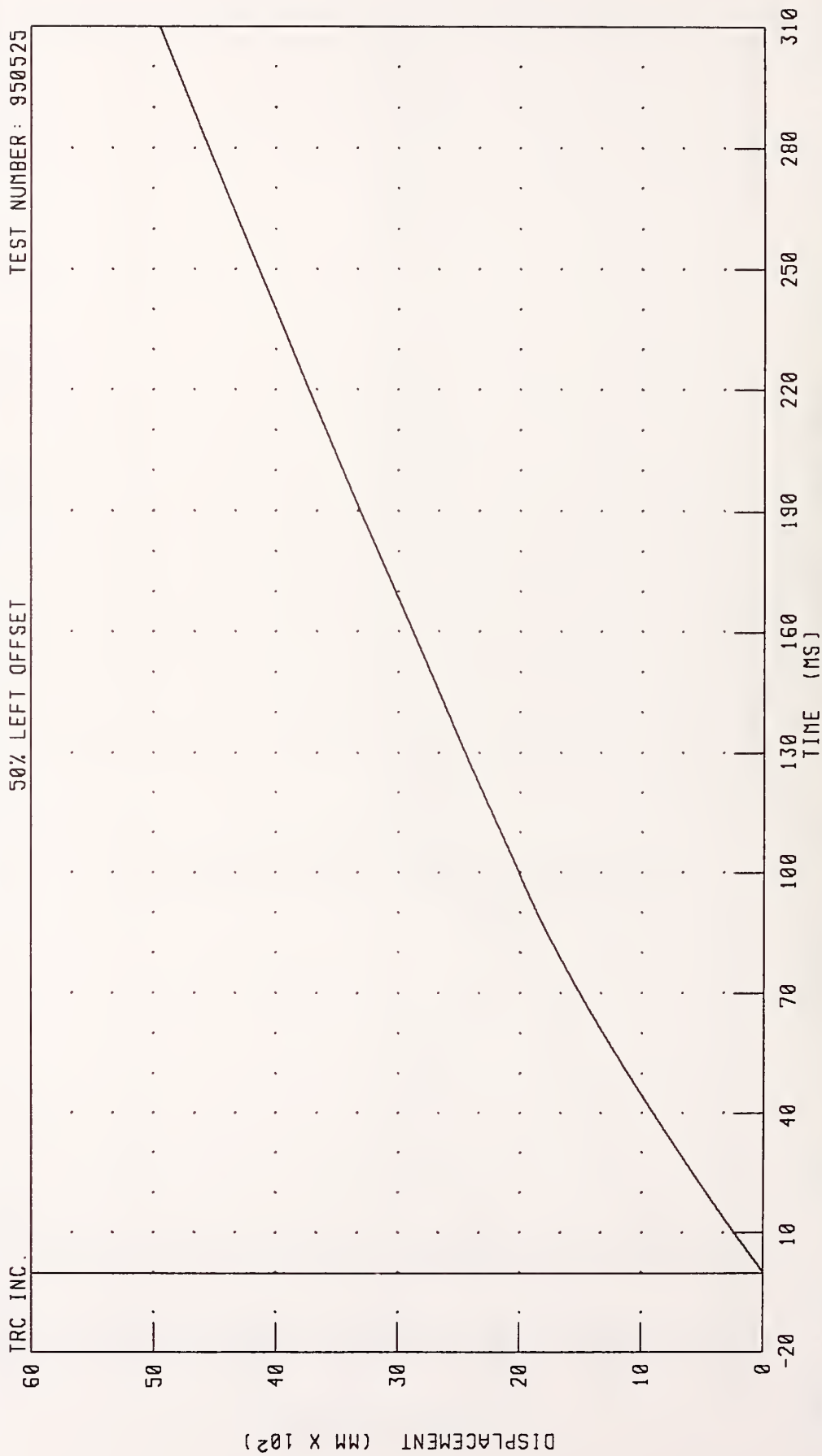
TRC INC.



CHANNEL LFSXV1 FILTER CH CLASS 180

PEAK DATA 88 70 KM/H @ 24 MS, 47 63 KM/H @ 100 24 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL X-AXIS DISPLACEMENT



CHANNEL: LFSXD1 FILTER: CH. CLASS 180

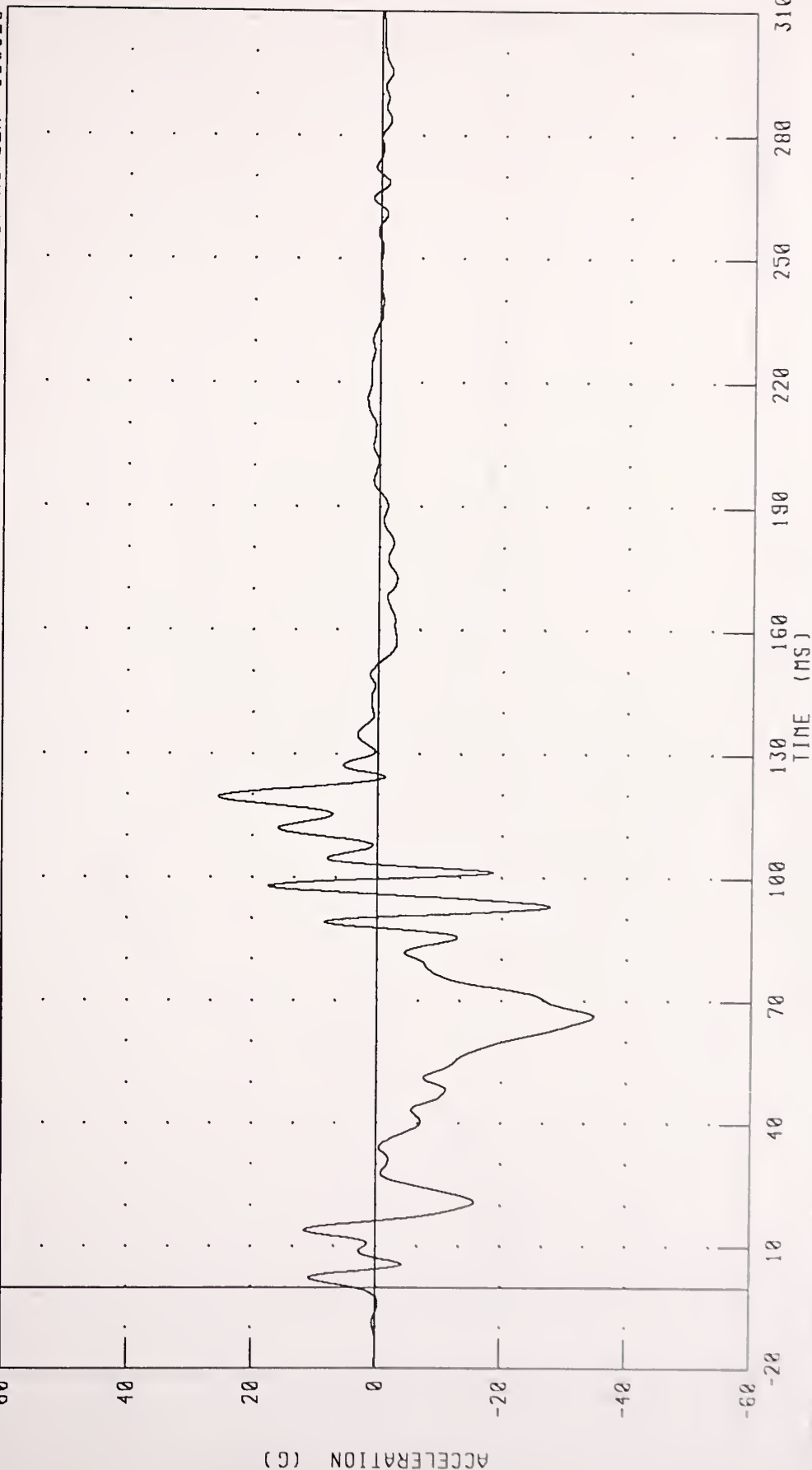
PEAK DATA: 4949.63 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

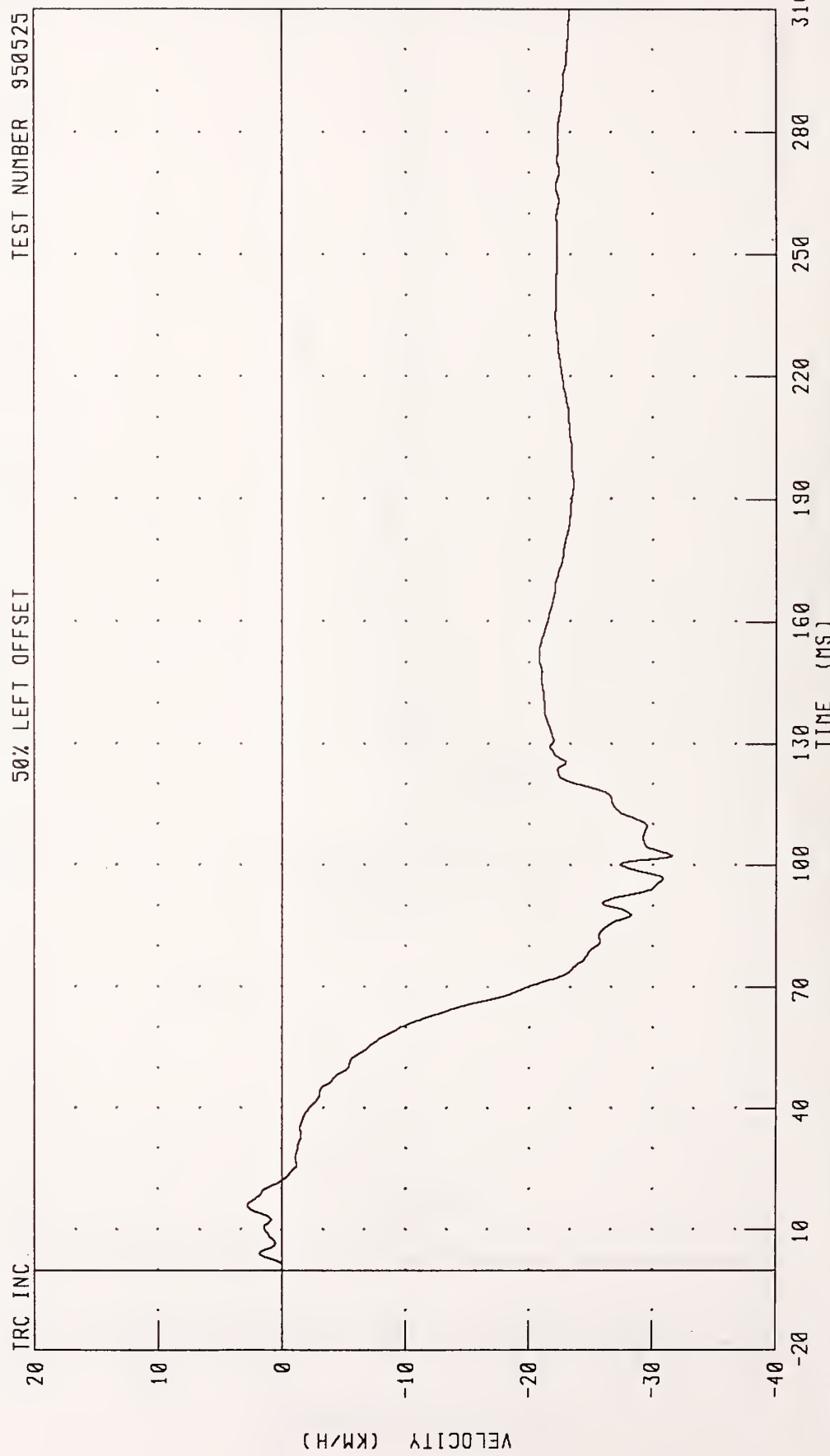
TRC INC.



CHANNEL LFSYG1 FILTER CH CLASS 60

PEAK DATA 25 51 G @ 119 60 MS, -34 88 G @ 66 32 MS

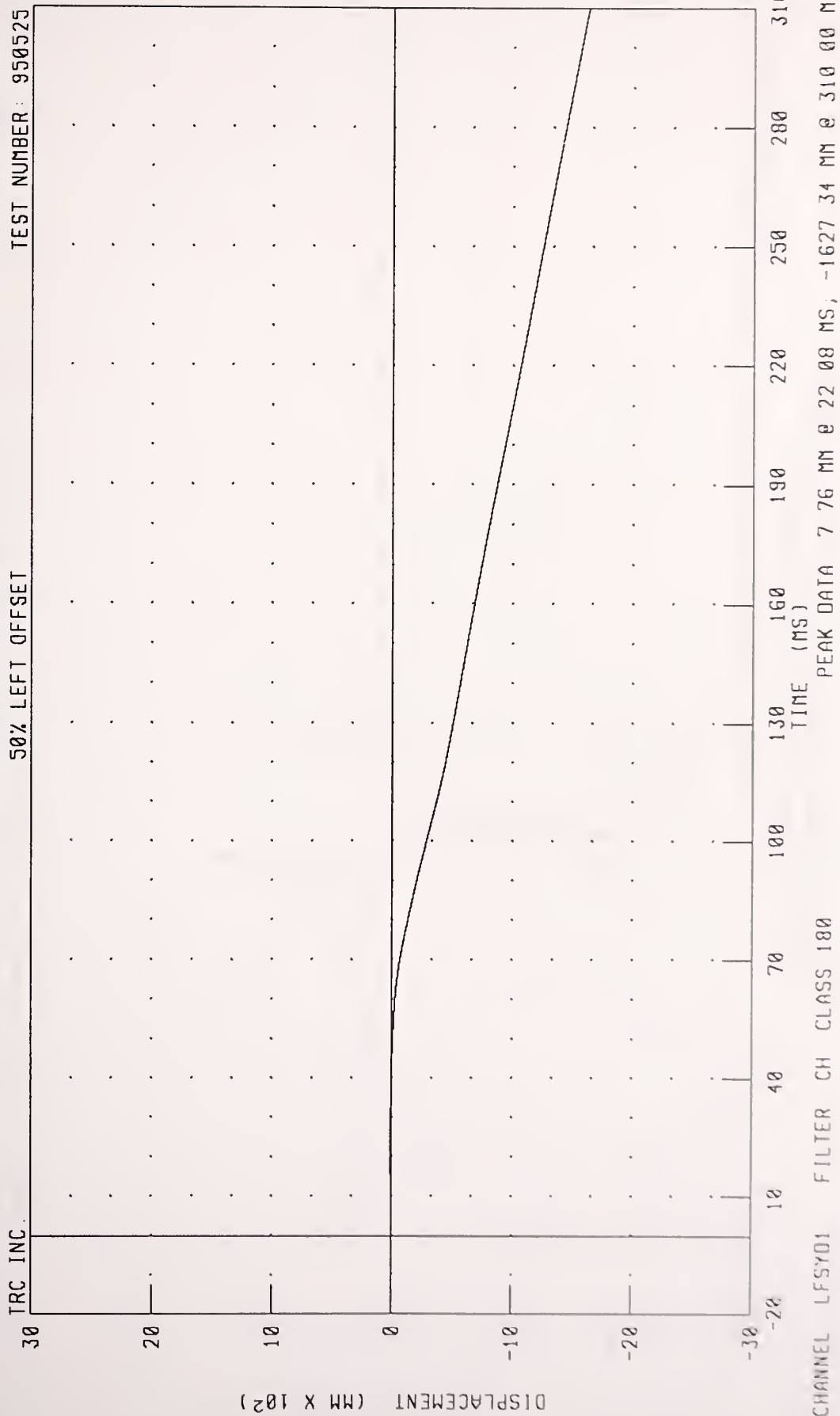
1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL Y-AXIS VELOCITY



CHANNEL: LFSYV1 FILTER: CH. CLASS 180

PEAK DATA: 2.78 KM/H @ 15.92 MS, -31.55 KM/H @ 102.24 MS

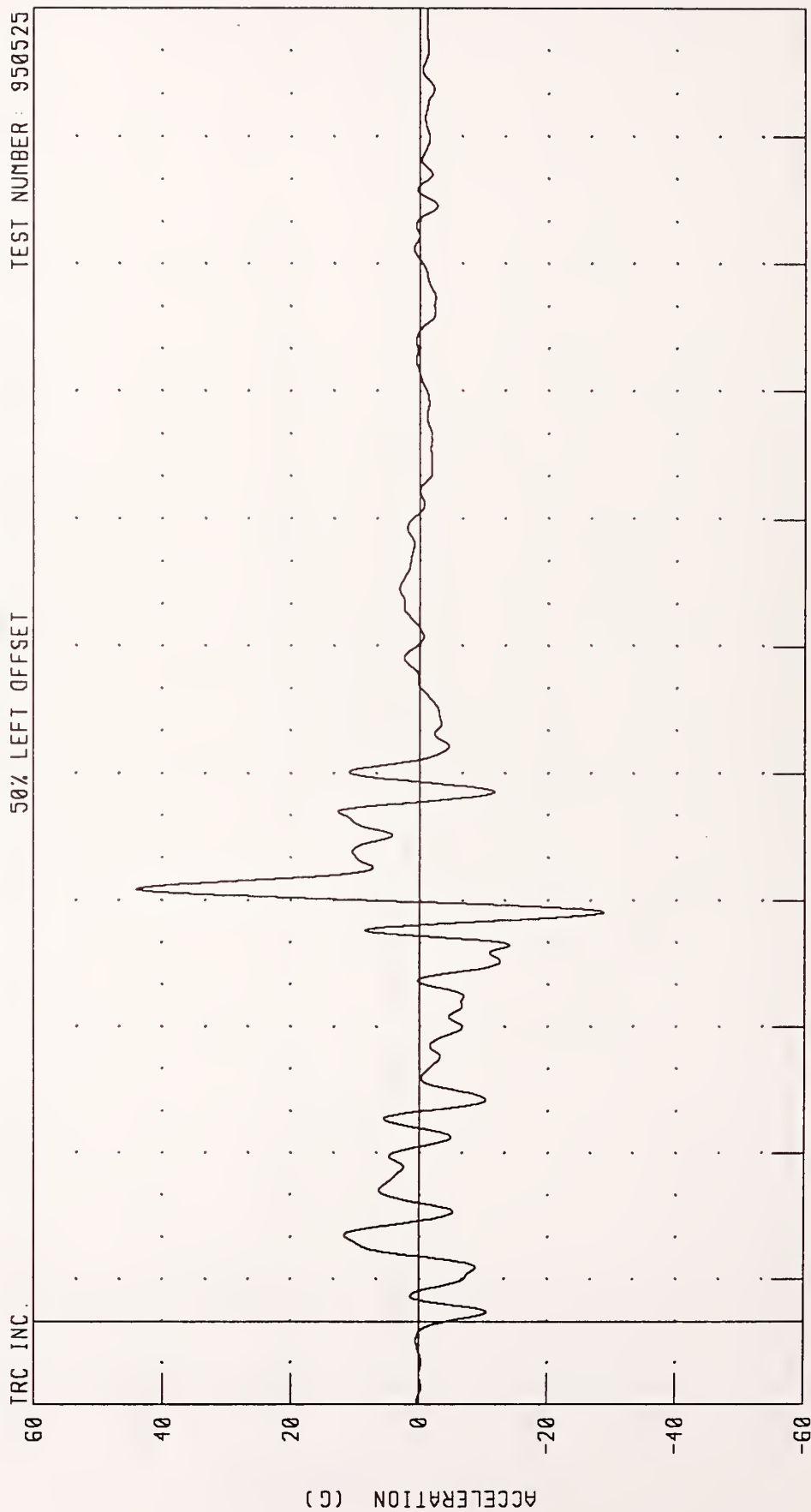
1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL Y-AXIS DISPLACEMENT



1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT FRONT SILL Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



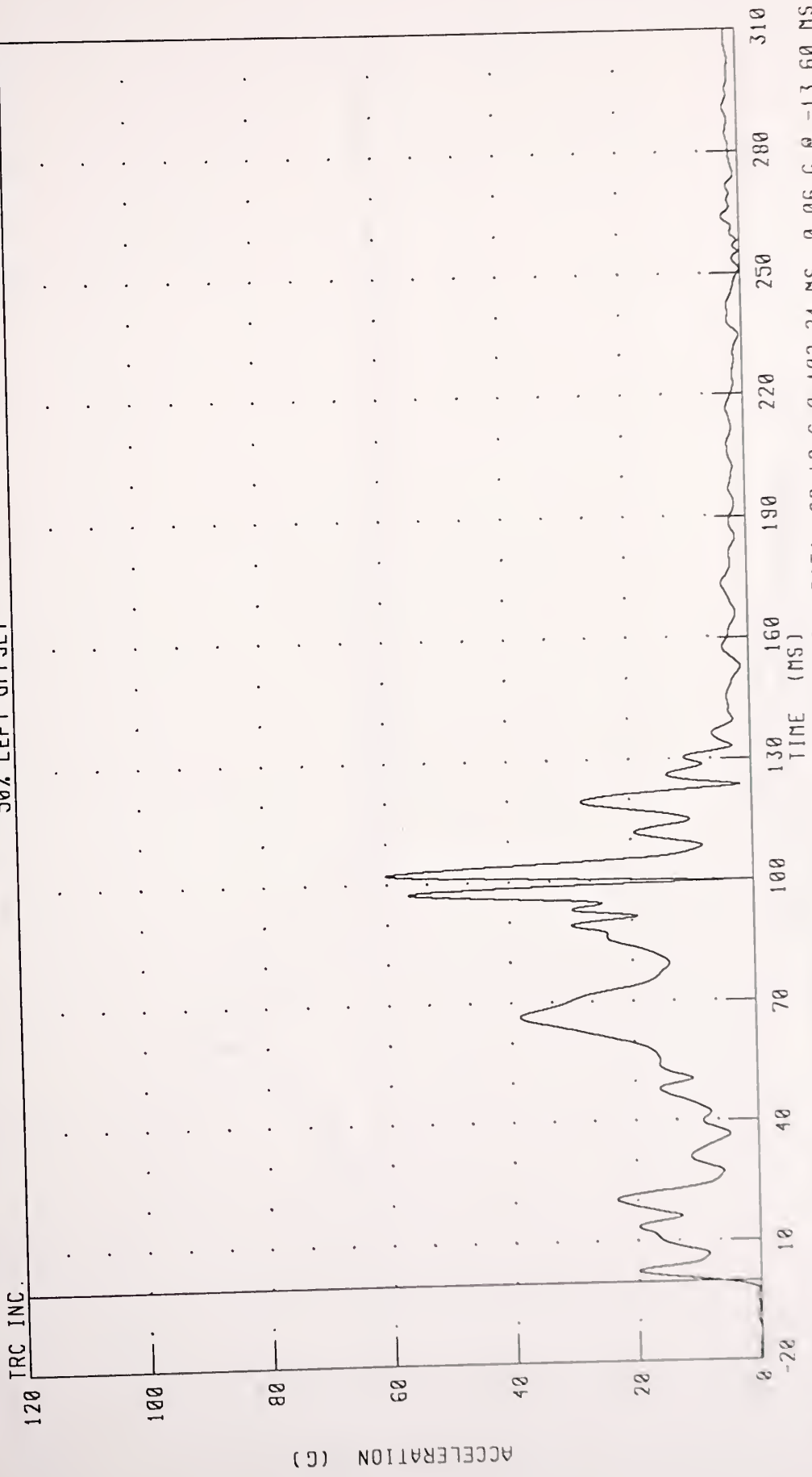
CHANNEL: LFSZG1 FILTER: CH. CLASS 60

PEAK DATA: 44.01 G @ 102.72 MS, -28.70 G @ 97.20 MS



1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 LEFT FRONT SILL RESULTANT ACCELERATION  
 50% LEFT OFFSET

TEST NUMBER: 950525



PEAK DATA 60 12 G @ 102 24 MS, 0 06 G @ -13 60 MS

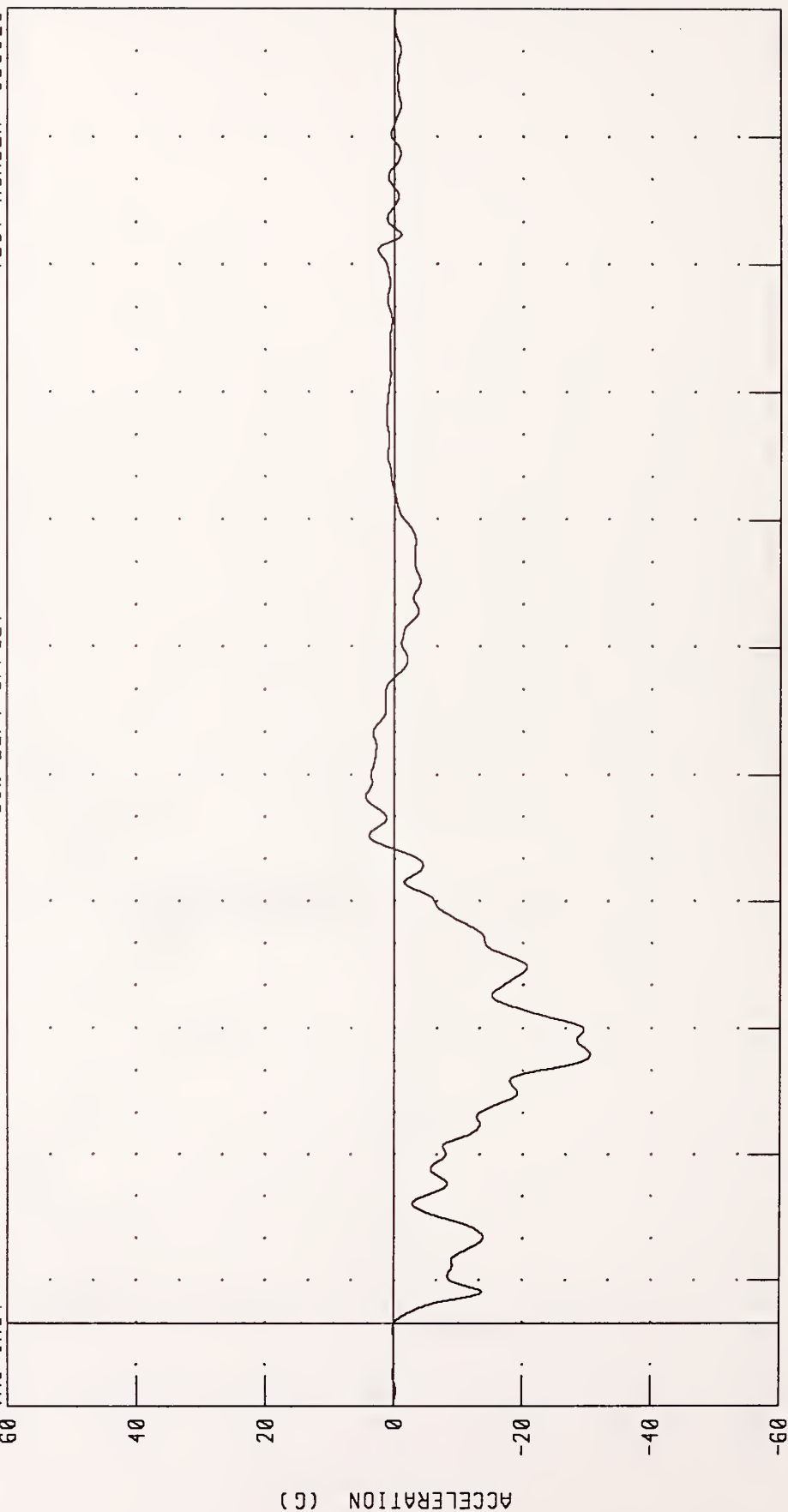
CHANNEL LFSRC1 FILTER CH CLASS 60

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



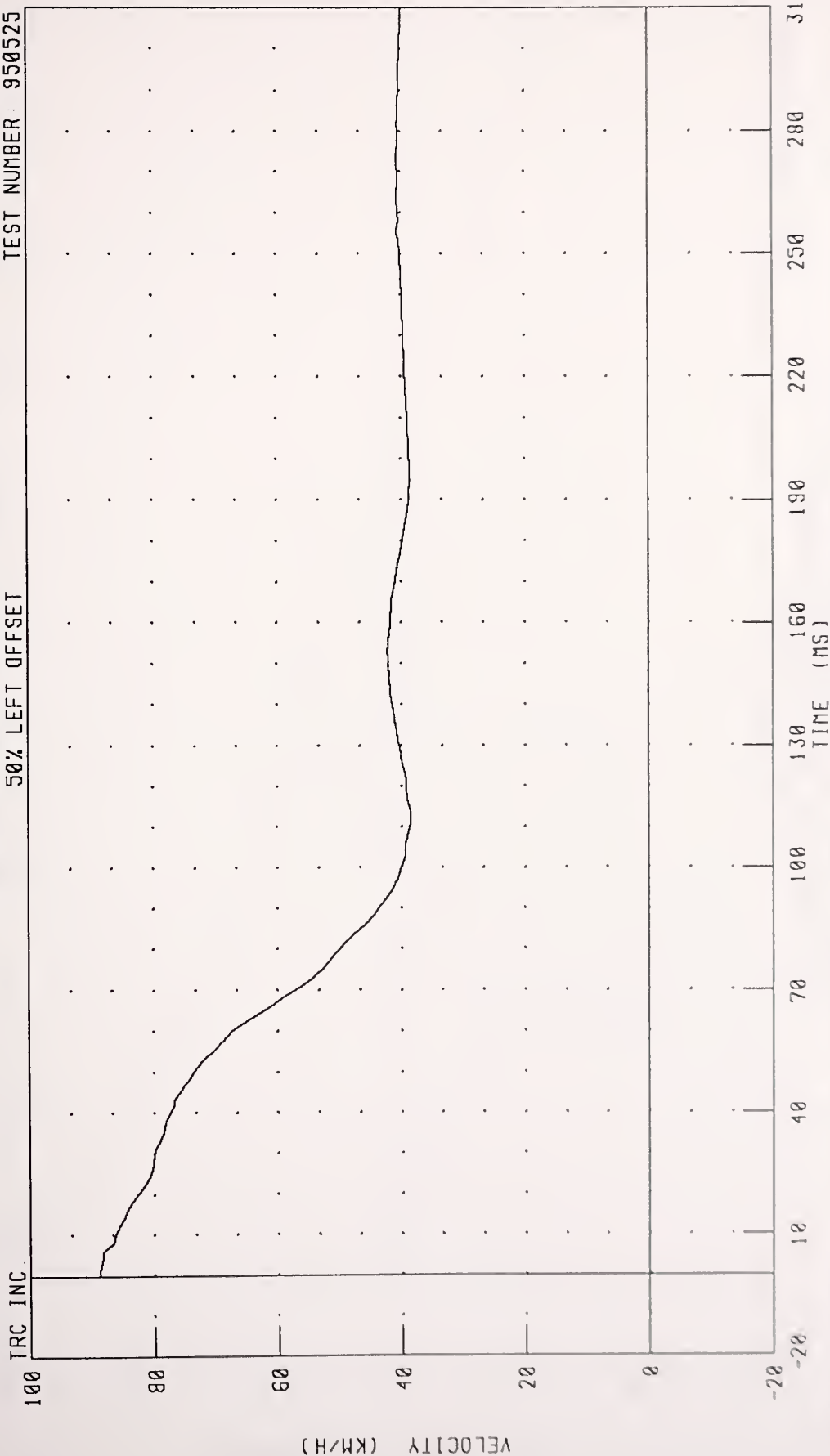
CHANNEL: RFSXG1 FILTER: CH. CLASS 60 PEAK DATA: 4.44 G @ 124.80 MS, -30.44 G @ 63.92 MS

# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER

## RIGHT FRONT SILL X-AXIS VELOCITY

50% LEFT OFFSET

TEST NUMBER: 950525



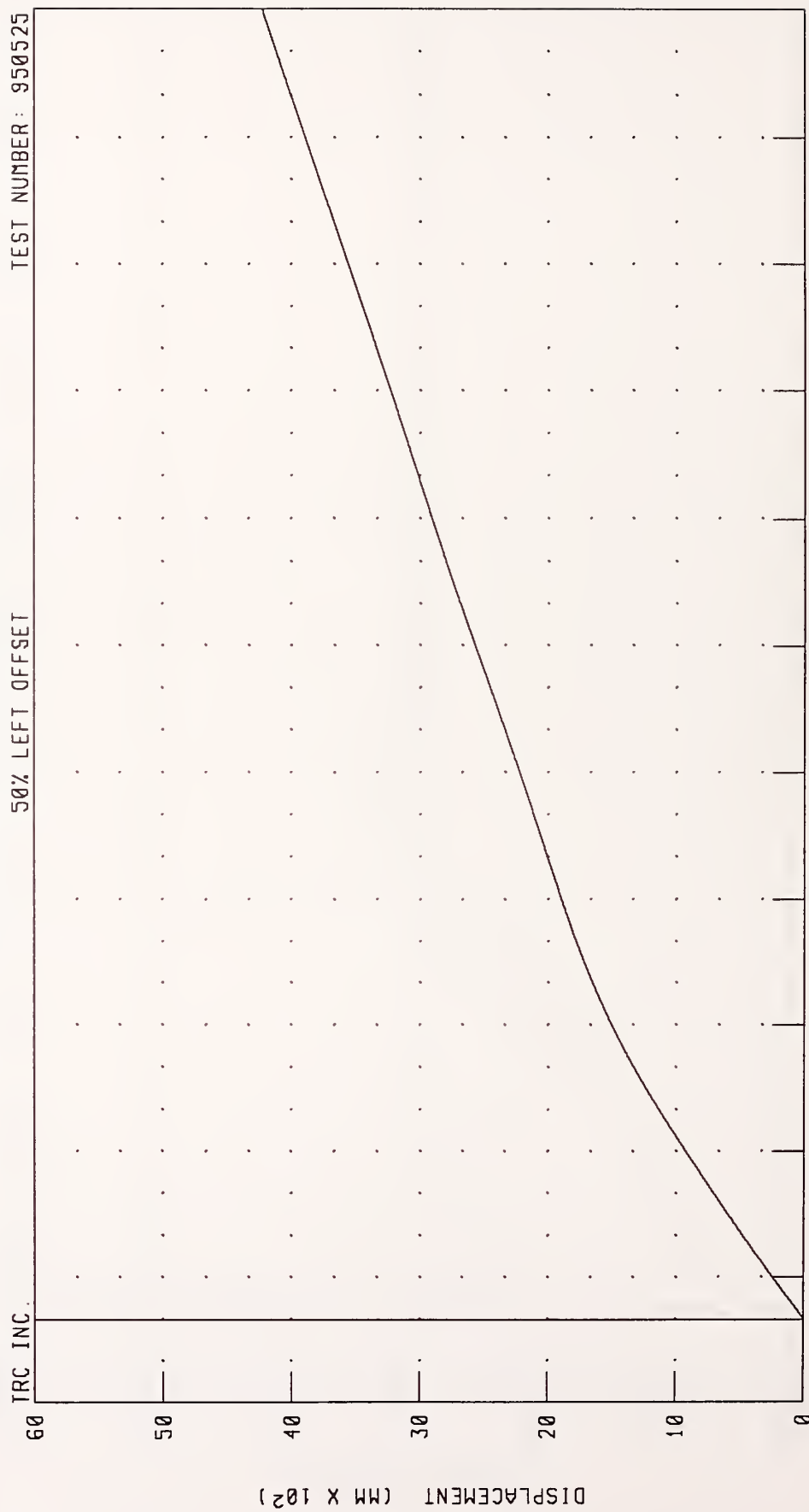
CHANNEL RFSXV1 FILTER CH CLASS 180

PEAK DATA 88 70 KM/H @ 64 MS, 38 42 KM/H @ 112 24 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL X-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: RFSXD1 FILTER: CH. CLASS 180

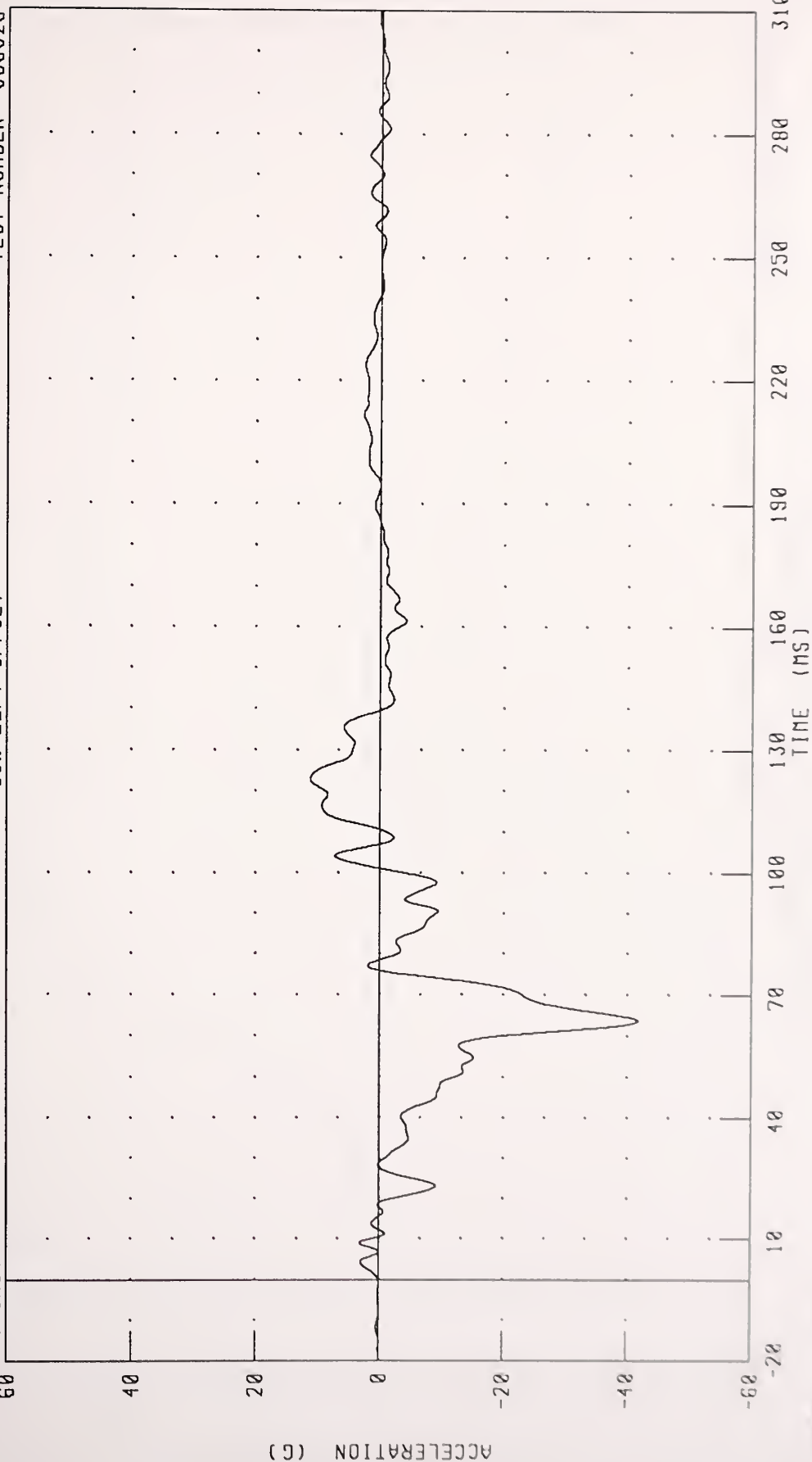
PEAK DATA: 4228.44 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 RIGHT FRONT SILL Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL RFSYCI FILTER CH CLASS 60

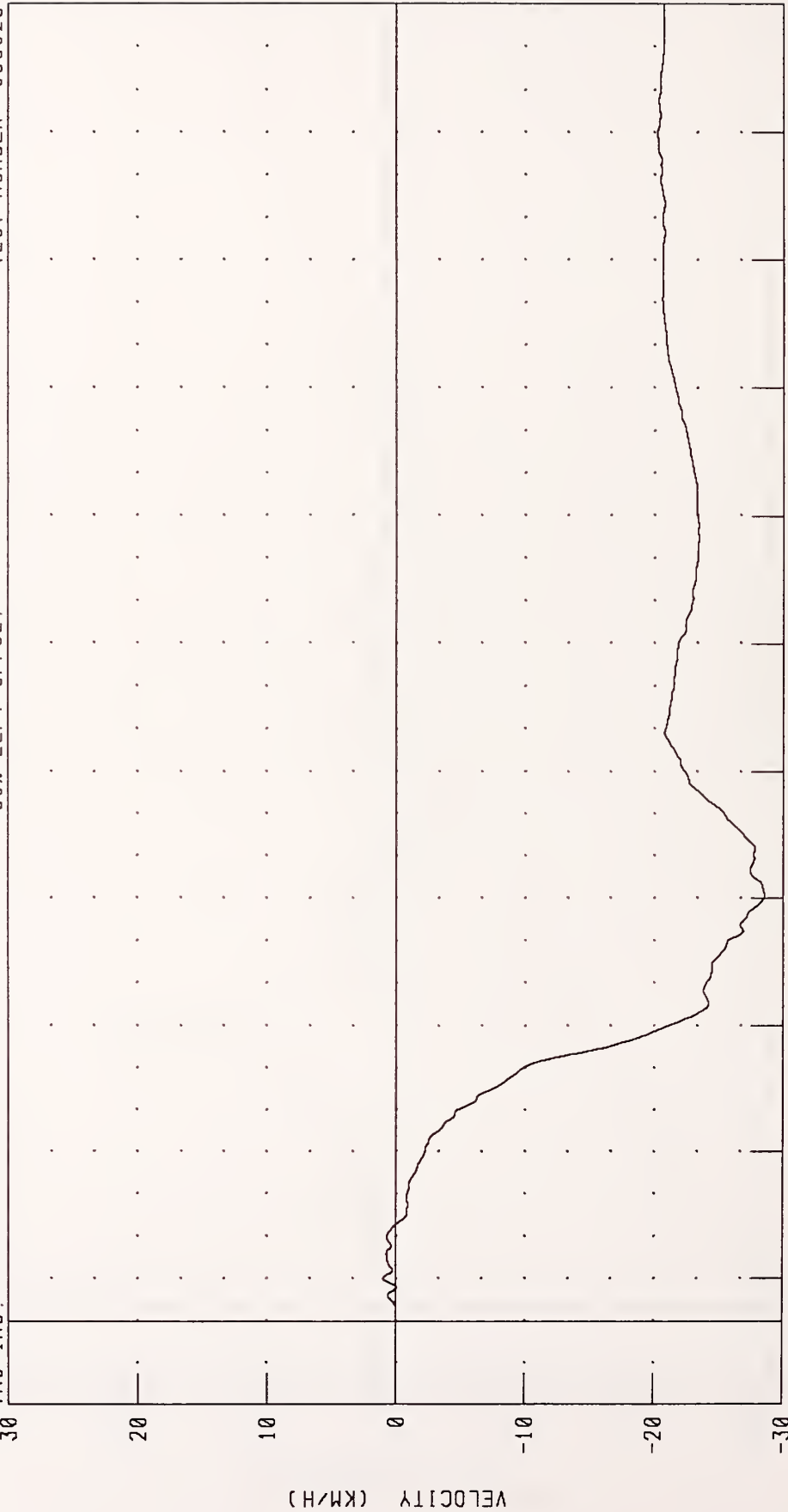
PEAK DATA 11 24 G @ 122 80 MS, -41 75 G @ 63 68 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL Y-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: RFSYV1 FILTER: CH. CLASS 180

PEAK DATA: 0.98 KM/H @ 10.00 MS; -28.52 KM/H @ 100.56 MS

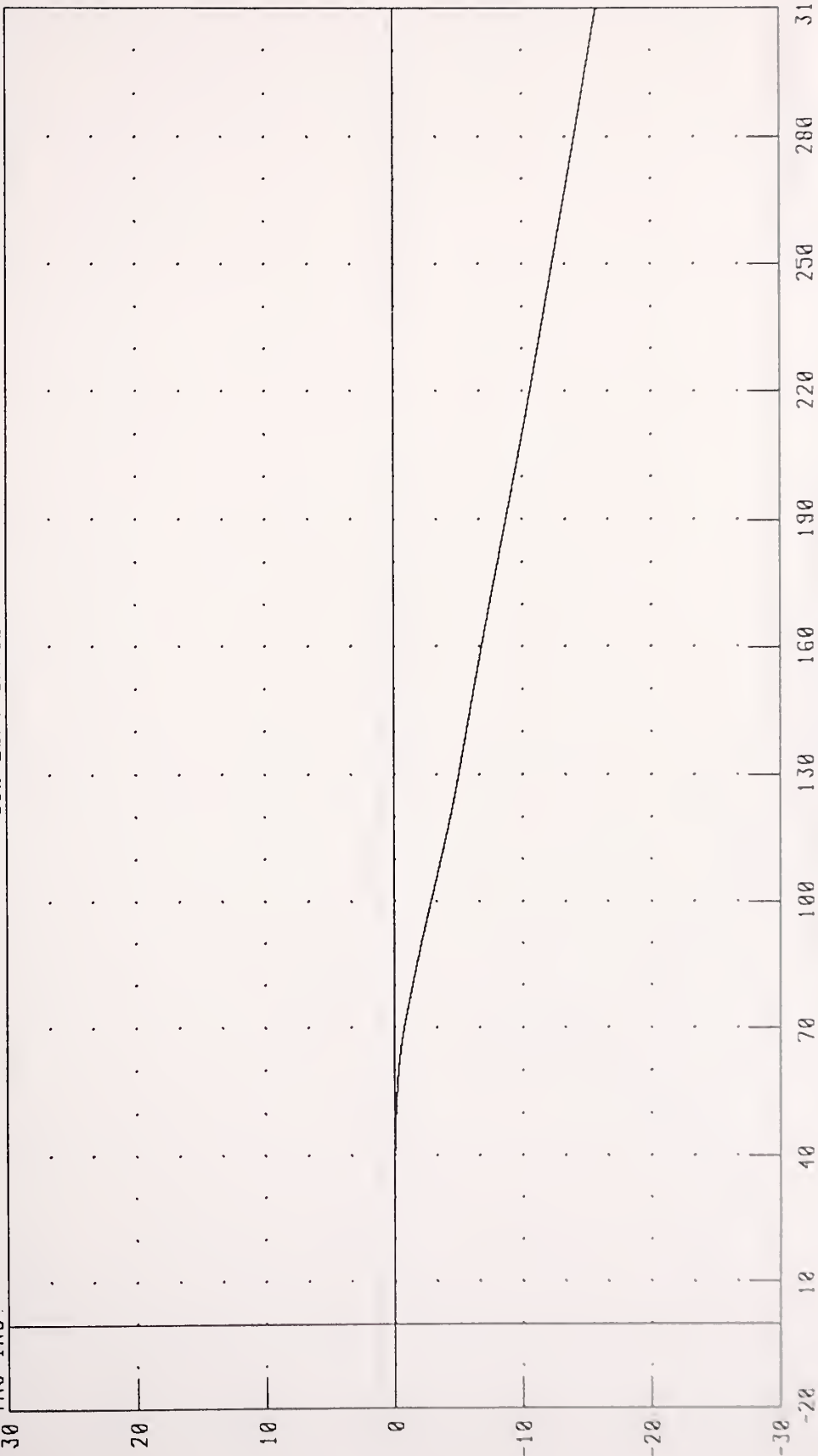


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL Y-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL RFSY01 FILTER CH CLASS 180

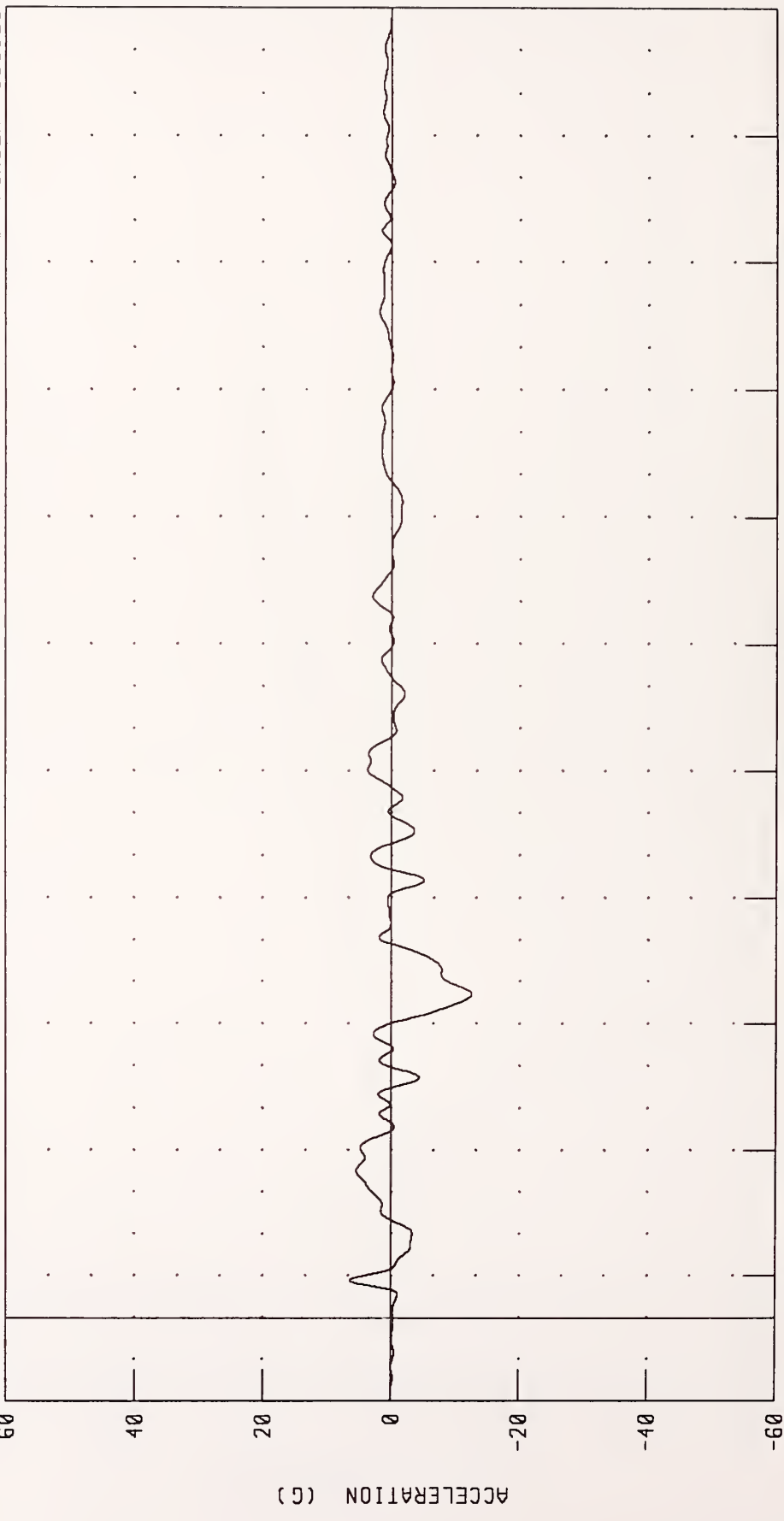
PEAK DATA 2 57 MM @ 22 80 MS, -1580 27 MM @ 310 00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

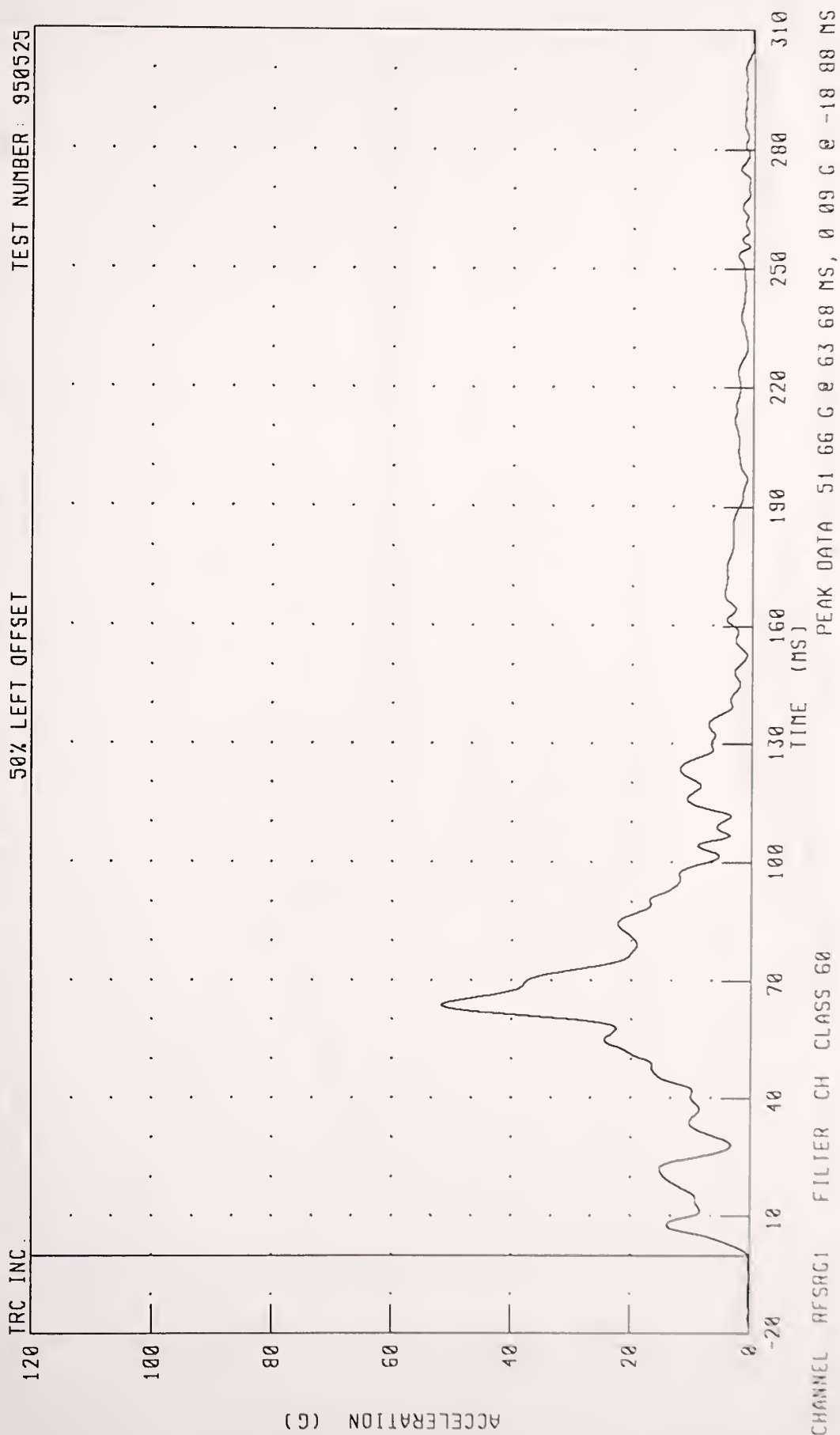
TRC INC.



CHANNEL: RFSZG1 FILTER: CH. CLASS 60

PEAK DATA: 6.36 G @ 8.88 MS, -12.57 G @ 77.12 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT FRONT SILL RESULTANT ACCELERATION

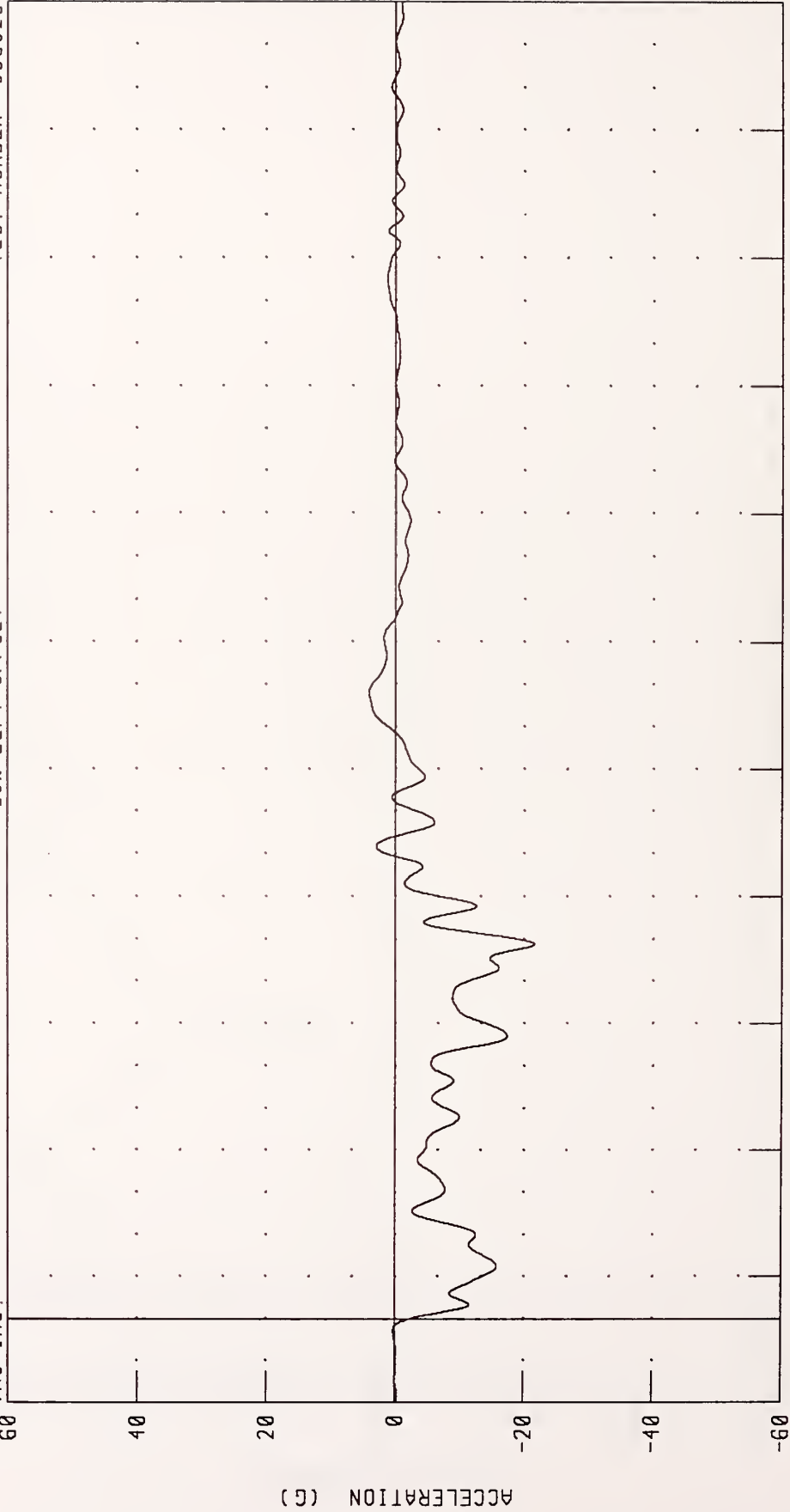


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



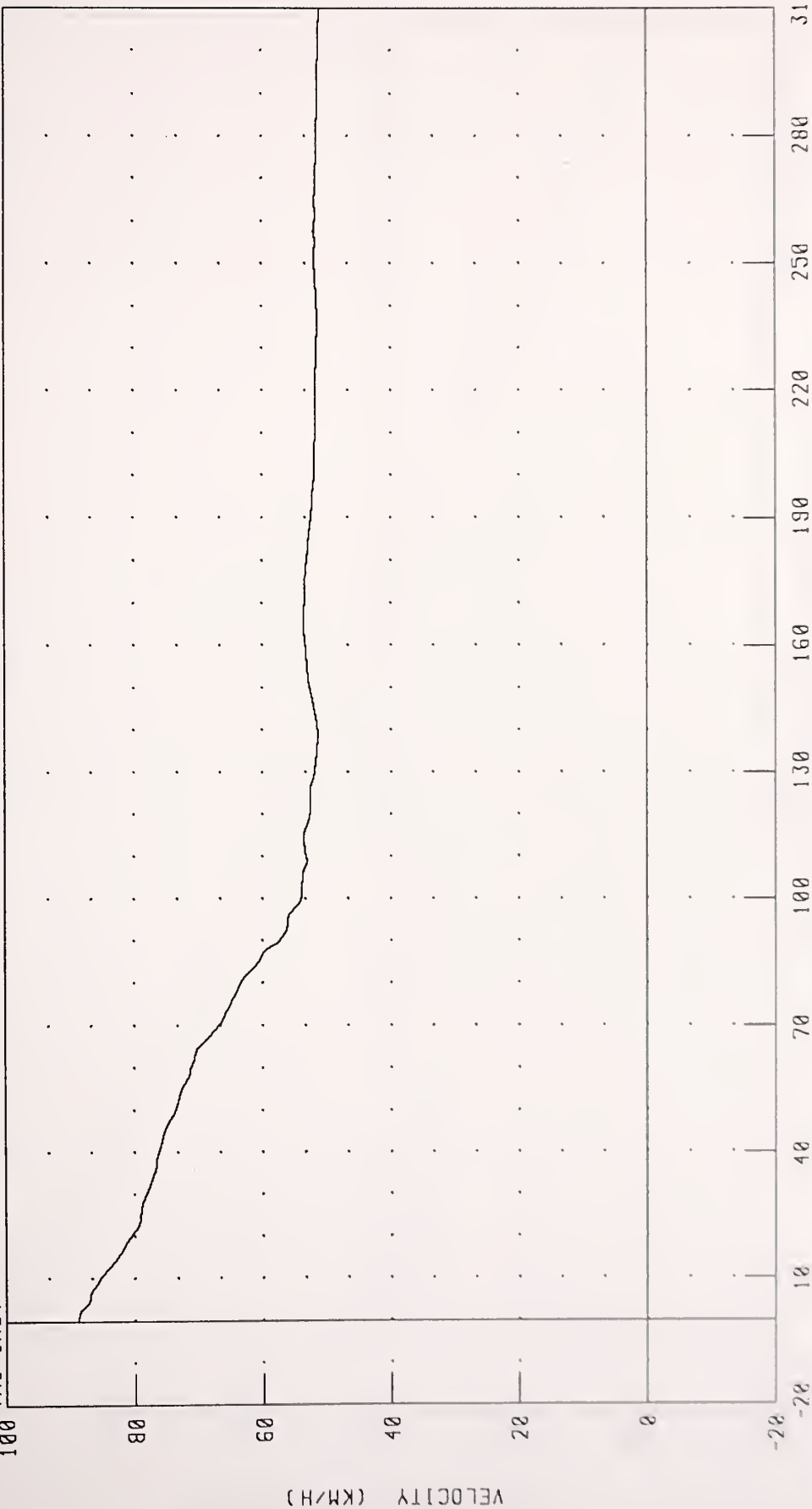
CHANNEL: TLRXG1 FILTER: CH. CLASS 60  
PEAK DATA: 4.12 G @ 147.84 MS, -21.64 G @ 88.88 MS

# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER LEFT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.

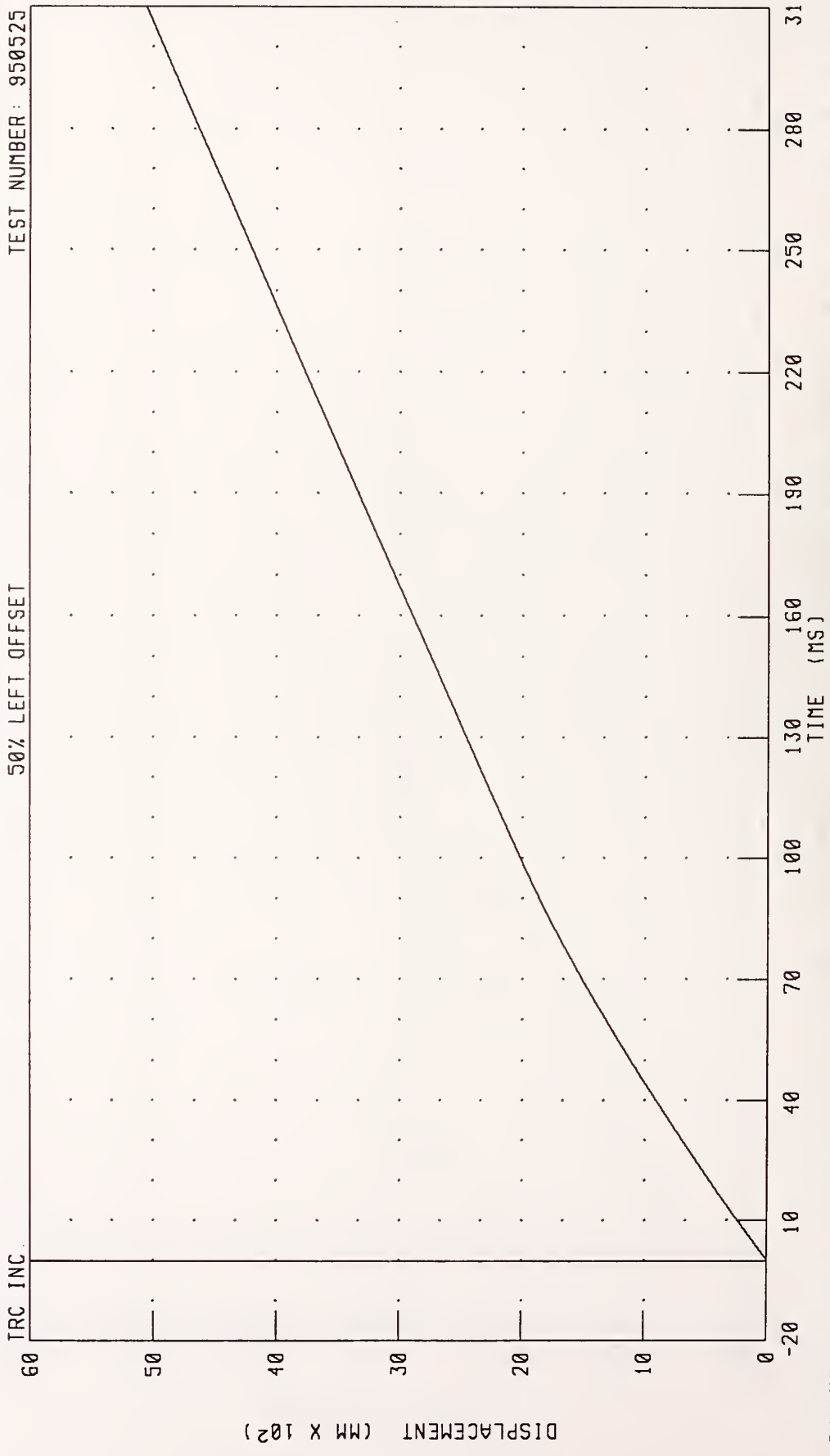


PEAK DATA

88 70 KM/H @ 0 48 MS, 51 02 KM/H @ 310 00 MS

CHANNEL 1LXXV1 FILTER CH CLASS 180

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT X-AXIS DISPLACEMENT



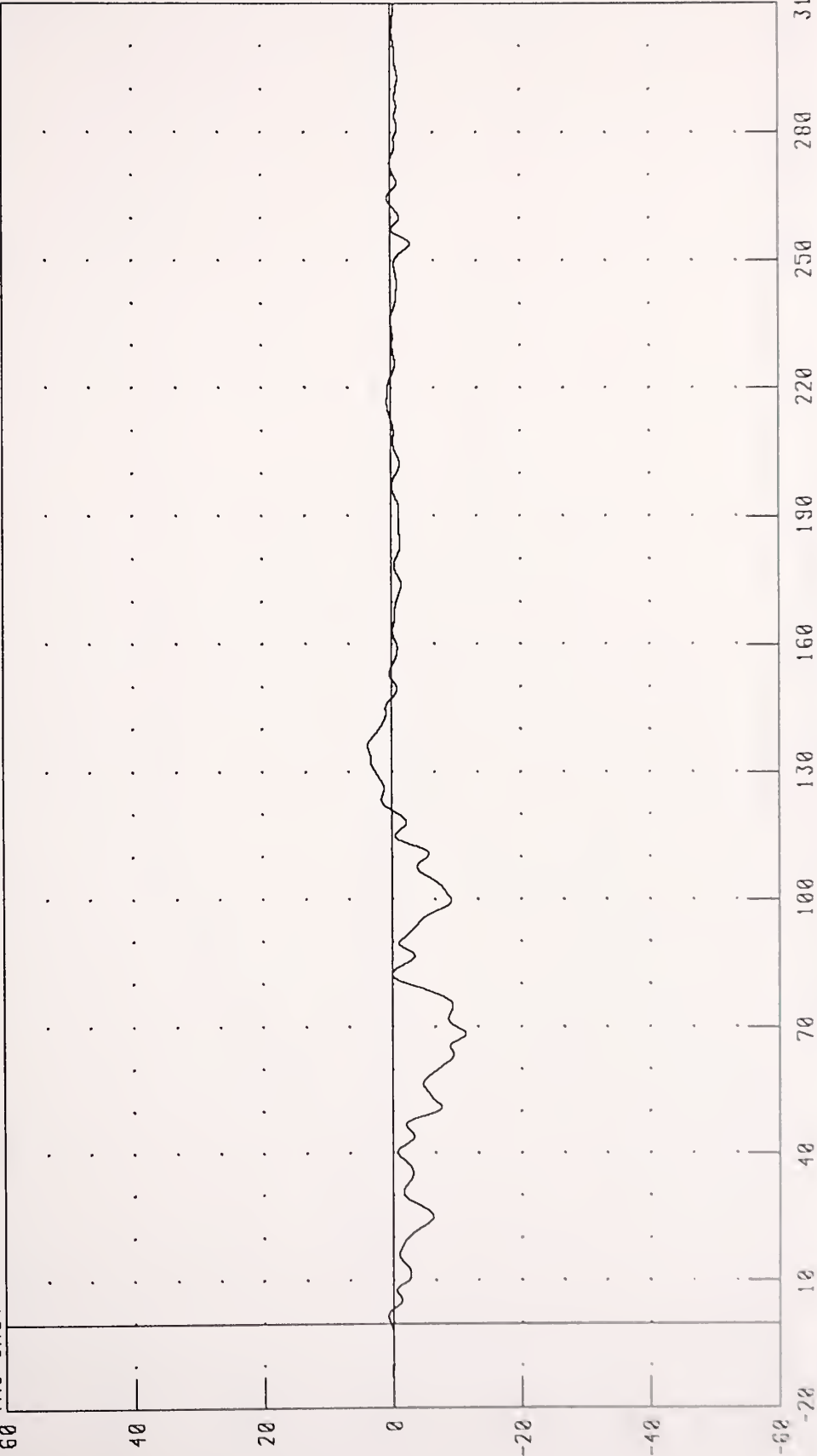


# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER LEFT REAR SEAT Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



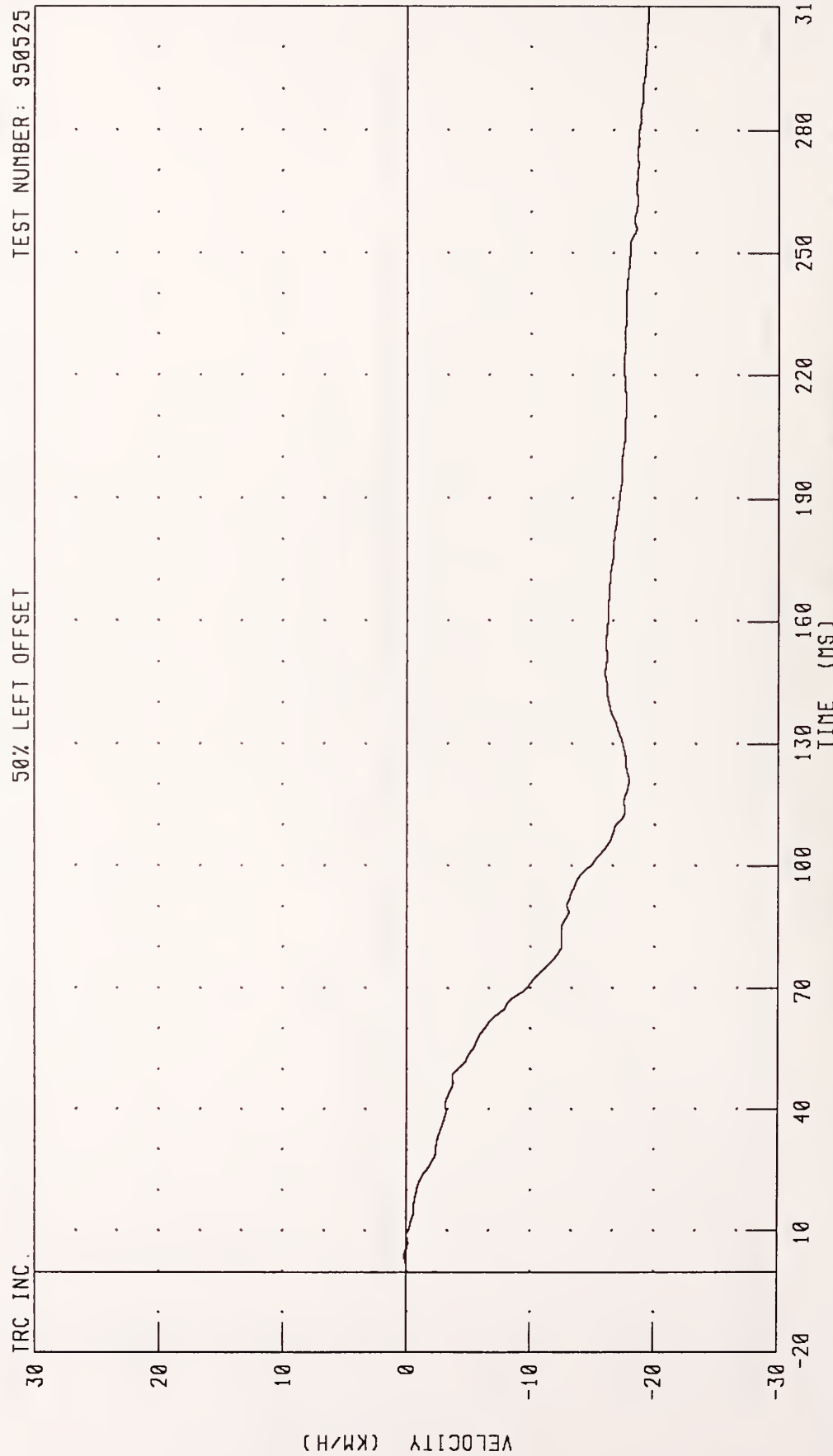
CHANNEL T1RYG1 FILTER CH CLASS 60

PEAK DATA 3 73 G @ 136 16 MS, -11 38 G @ 68 48 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT Y-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL: TLRYV1 FILTER: CH. CLASS 180

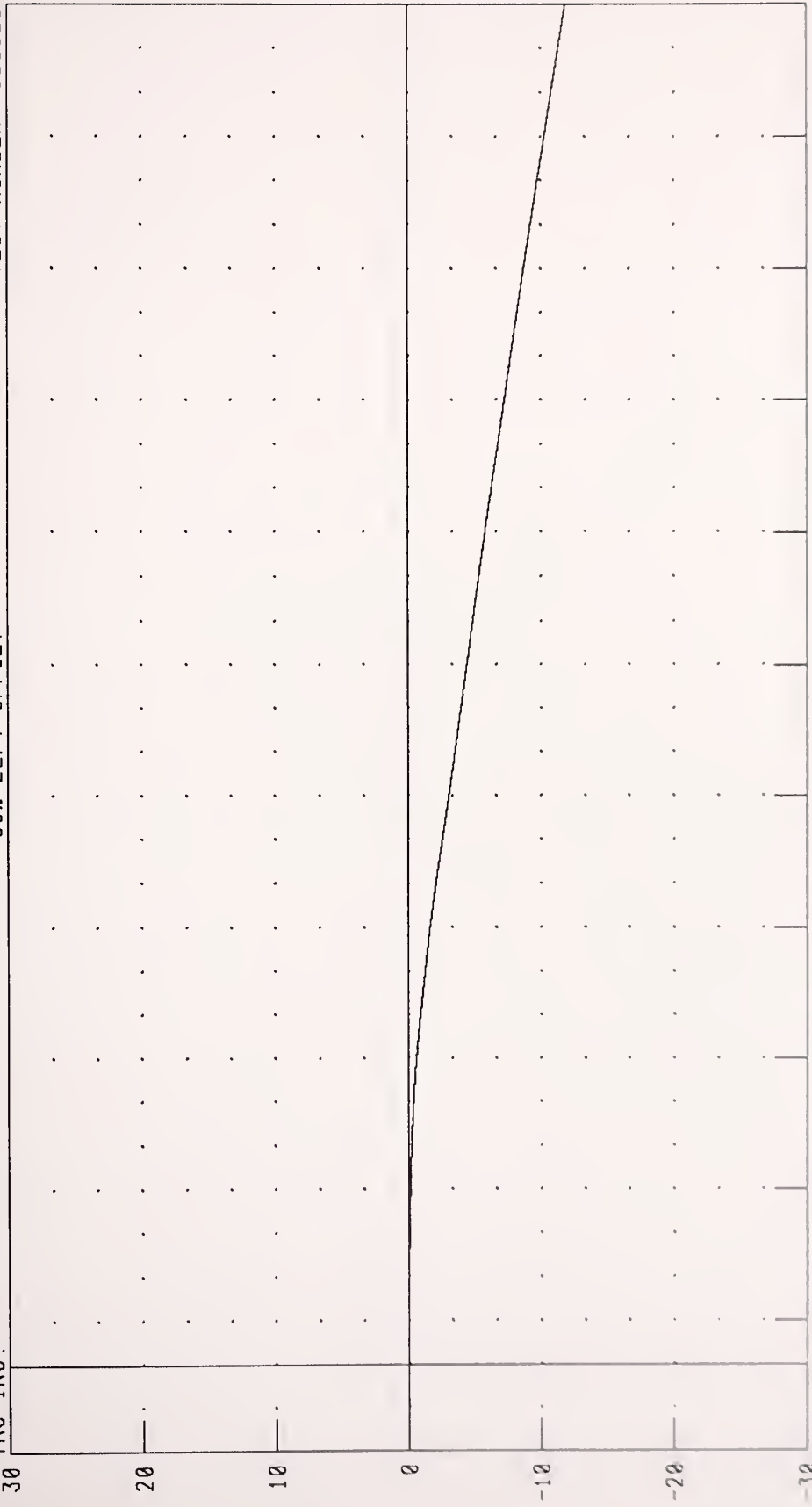
PEAK DATA: 0.16 KM/H @ 3.84 MS; -19.50 KM/H @ 310.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT Y-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



DISPLACEMENT (MM X 10<sup>2</sup>)

TIME (MS)

CHANNEL ILRY01 FILTER CH CLASS 180

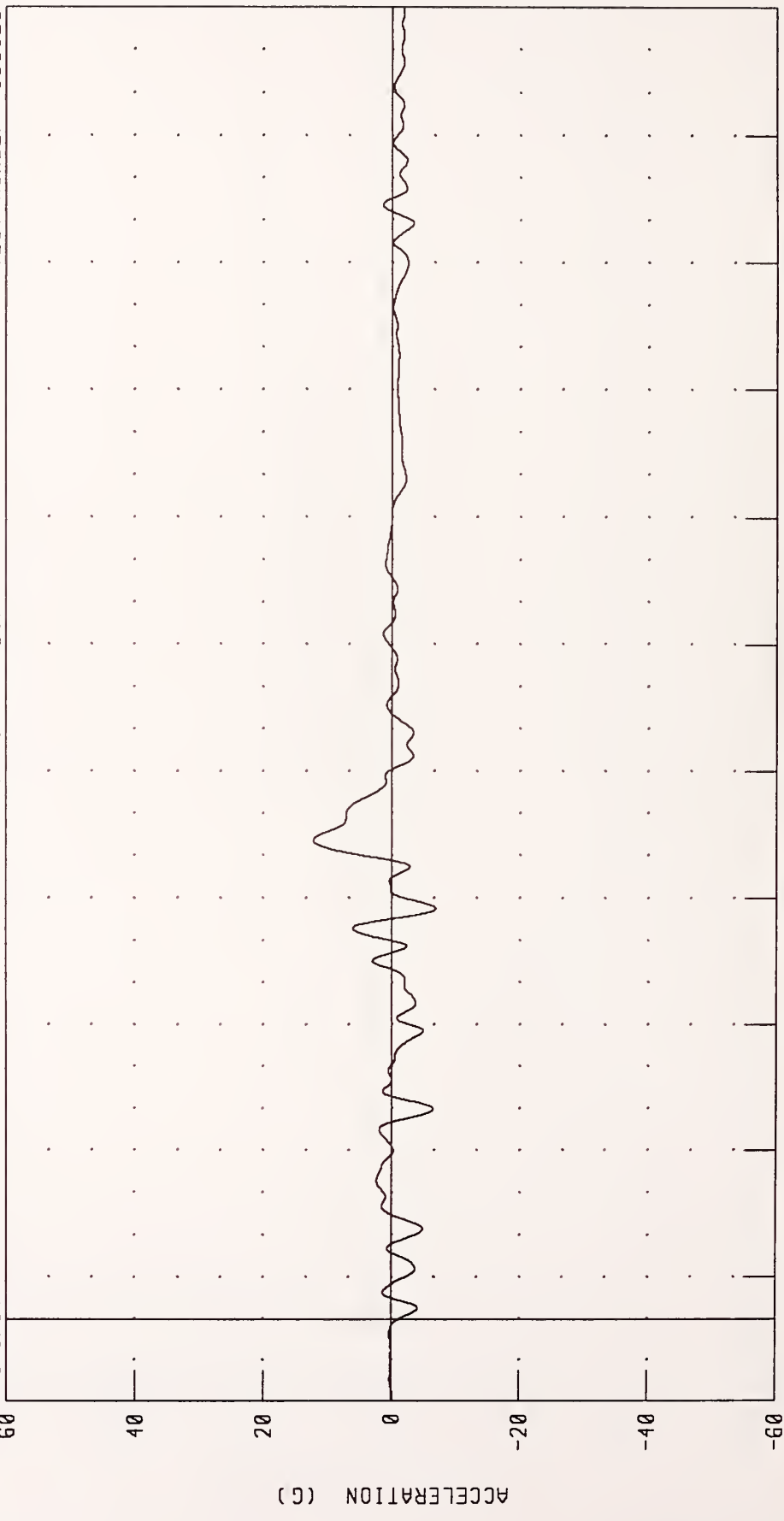
PEAK DATA 0 10 MM @ 5 44 MS, -1189 03 MM @ 310 00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT Z-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



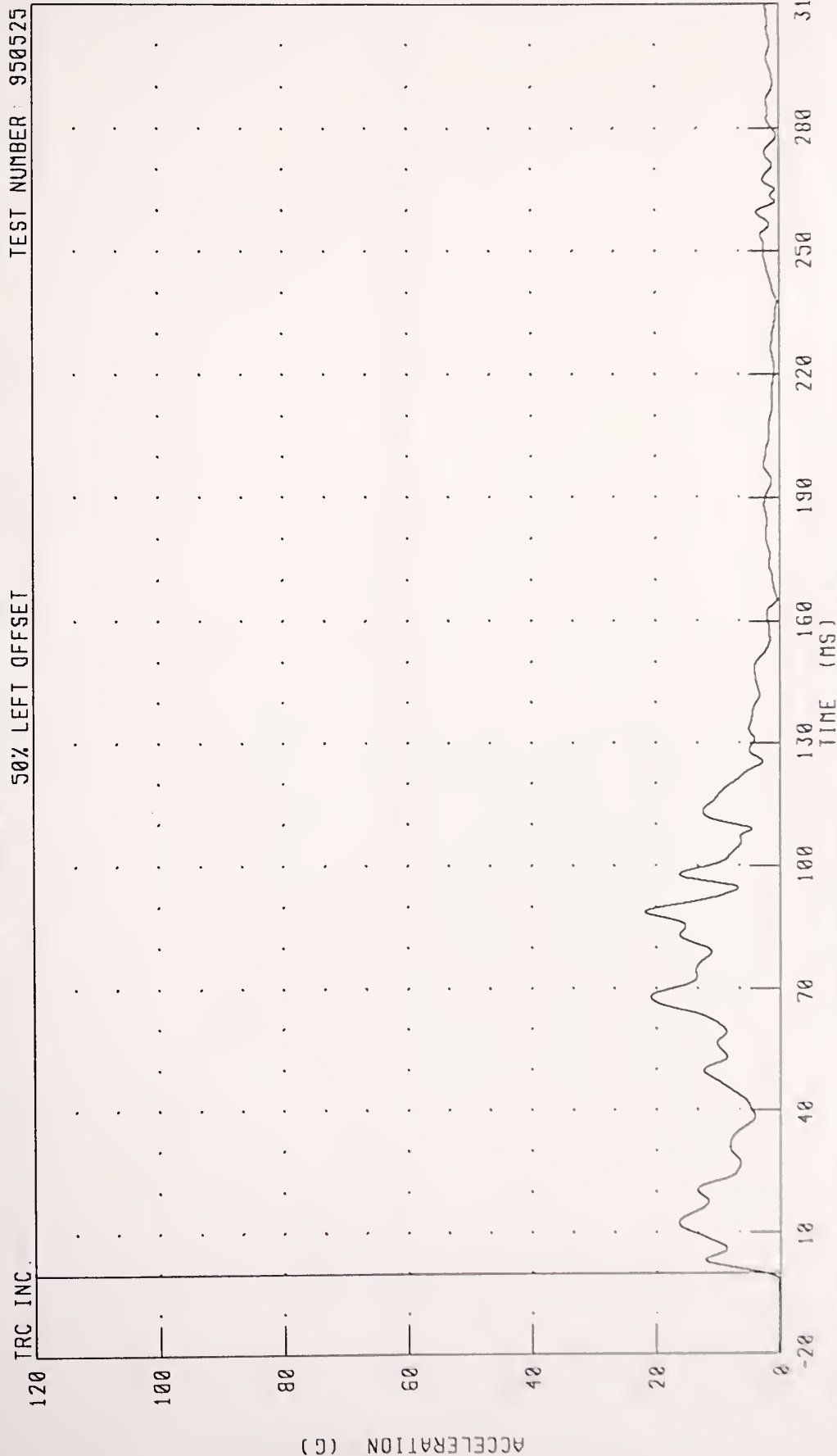
CHANNEL: TLRZG1 FILTER: CH. CLASS 60

PEAK DATA: 12.24 G @ 113.68 MS; -6.88 G @ 97.52 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
LEFT REAR SEAT RESULTANT ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET



CHANNEL TLARG1 FILTER CH CLASS 60

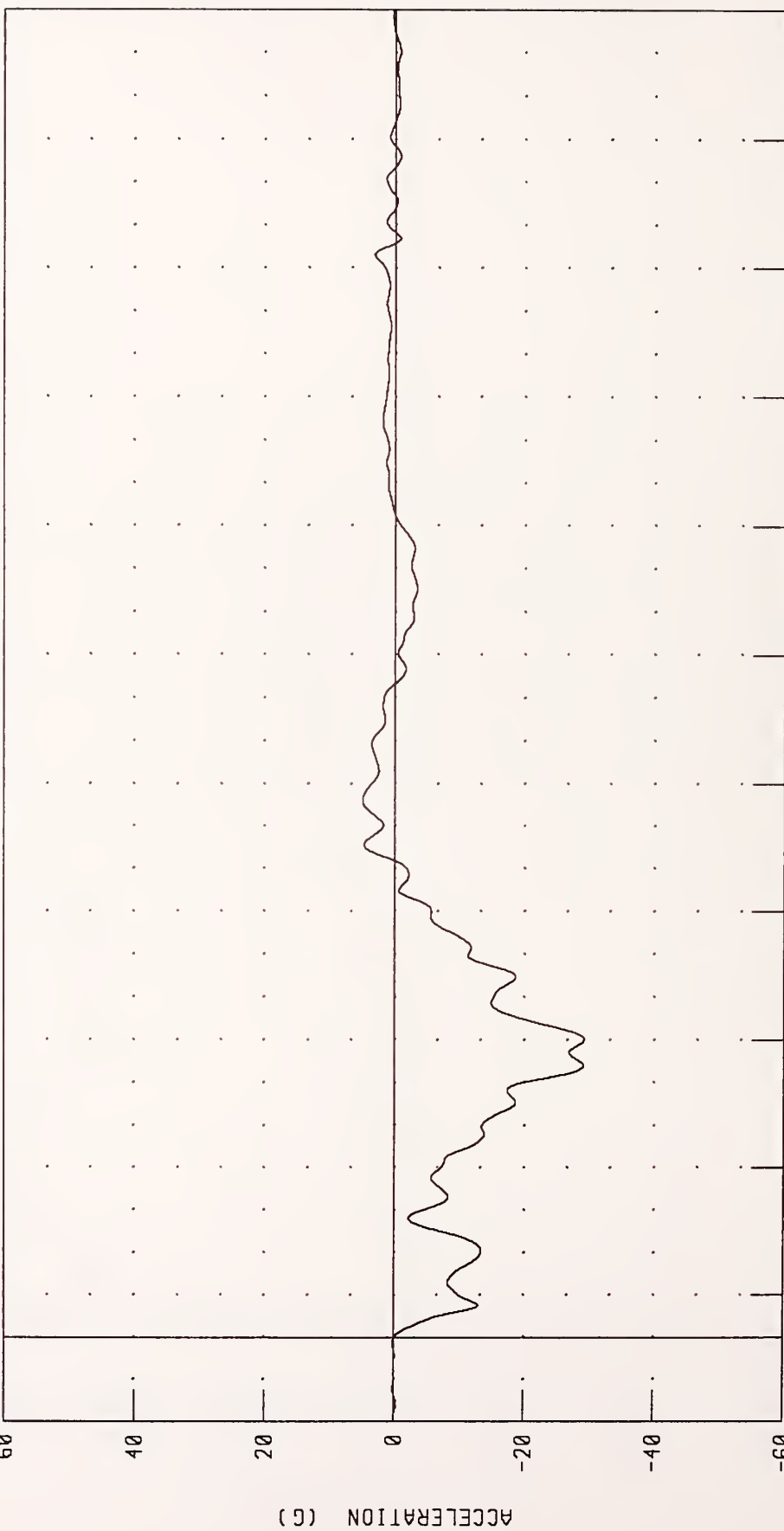
PEAK DATA 21 82 G @ 88 80 MS, 0 07 G @ -1 76 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 4.97 G @ 126.00 MS; -29.23 G @ 70.16 MS

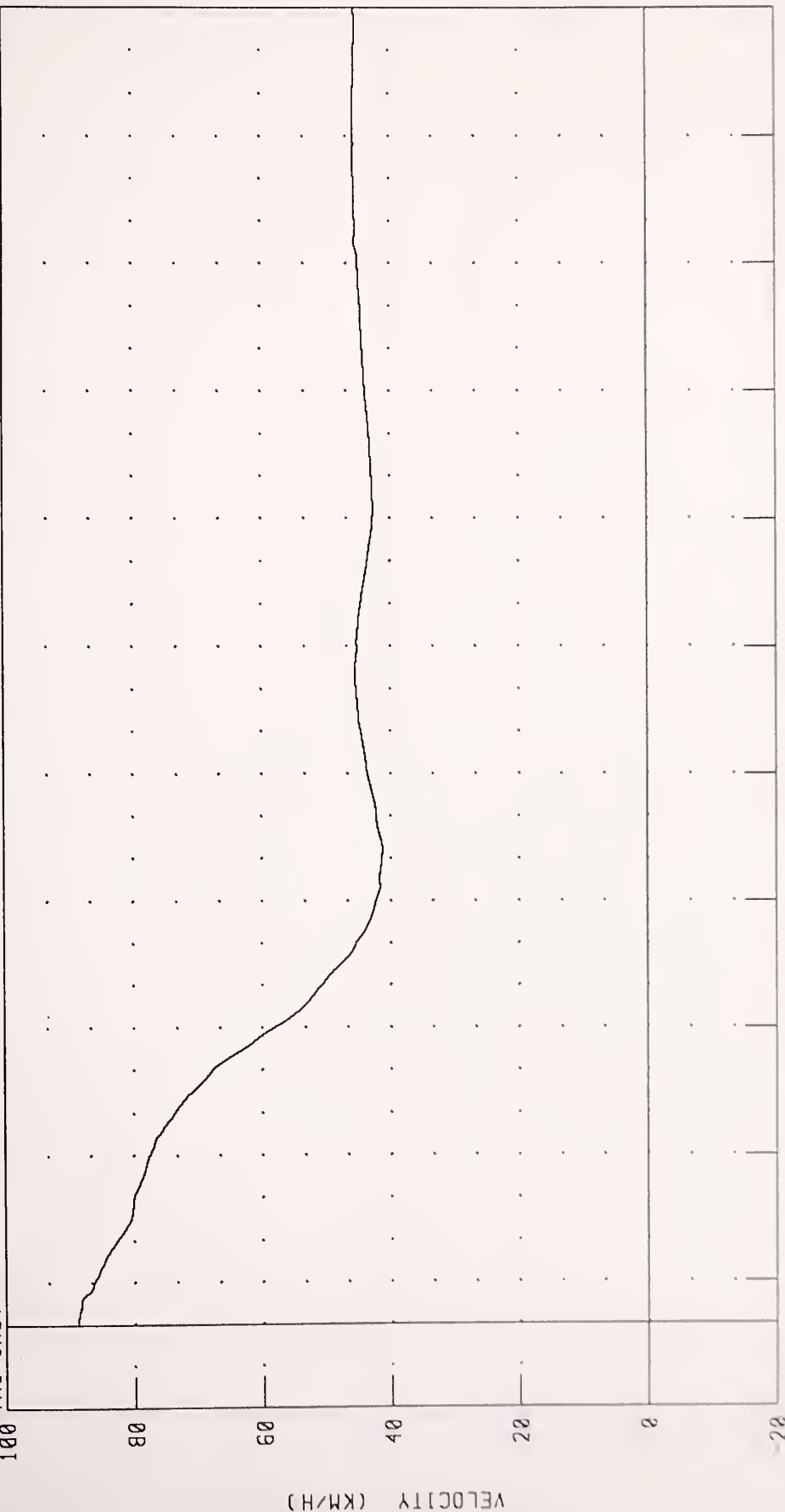


1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.

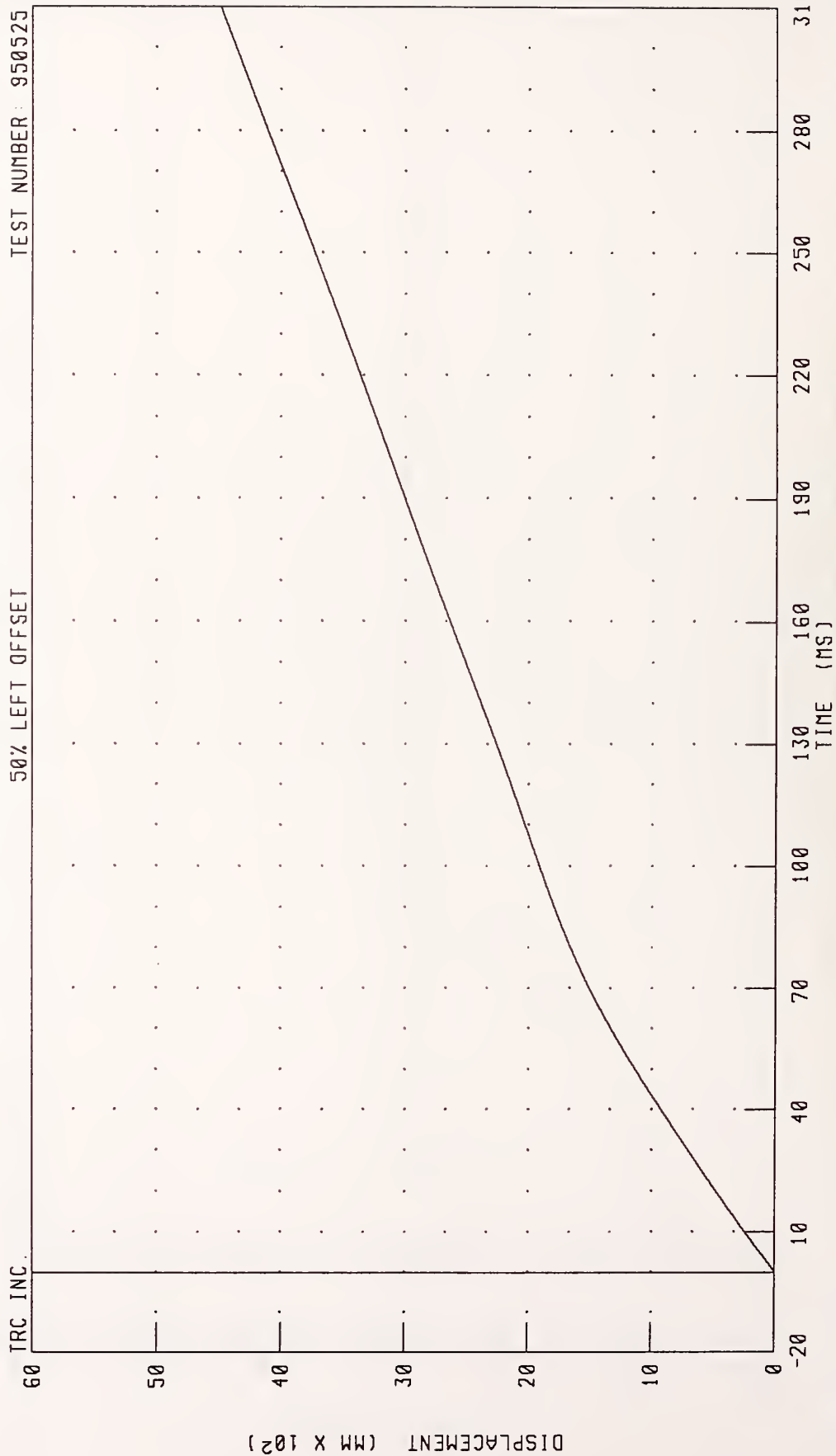


TIME (MS)

CHANNEL TRXXV1 FILTER CH CLASS 180

PEAK DATA 88 70 KM/H @ 0 00 MS, 41 21 KM/H @ 112 08 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT REAR SEAT X-AXIS DISPLACEMENT



CHANNEL: TRRXD1 FILTER: CH CLASS 180

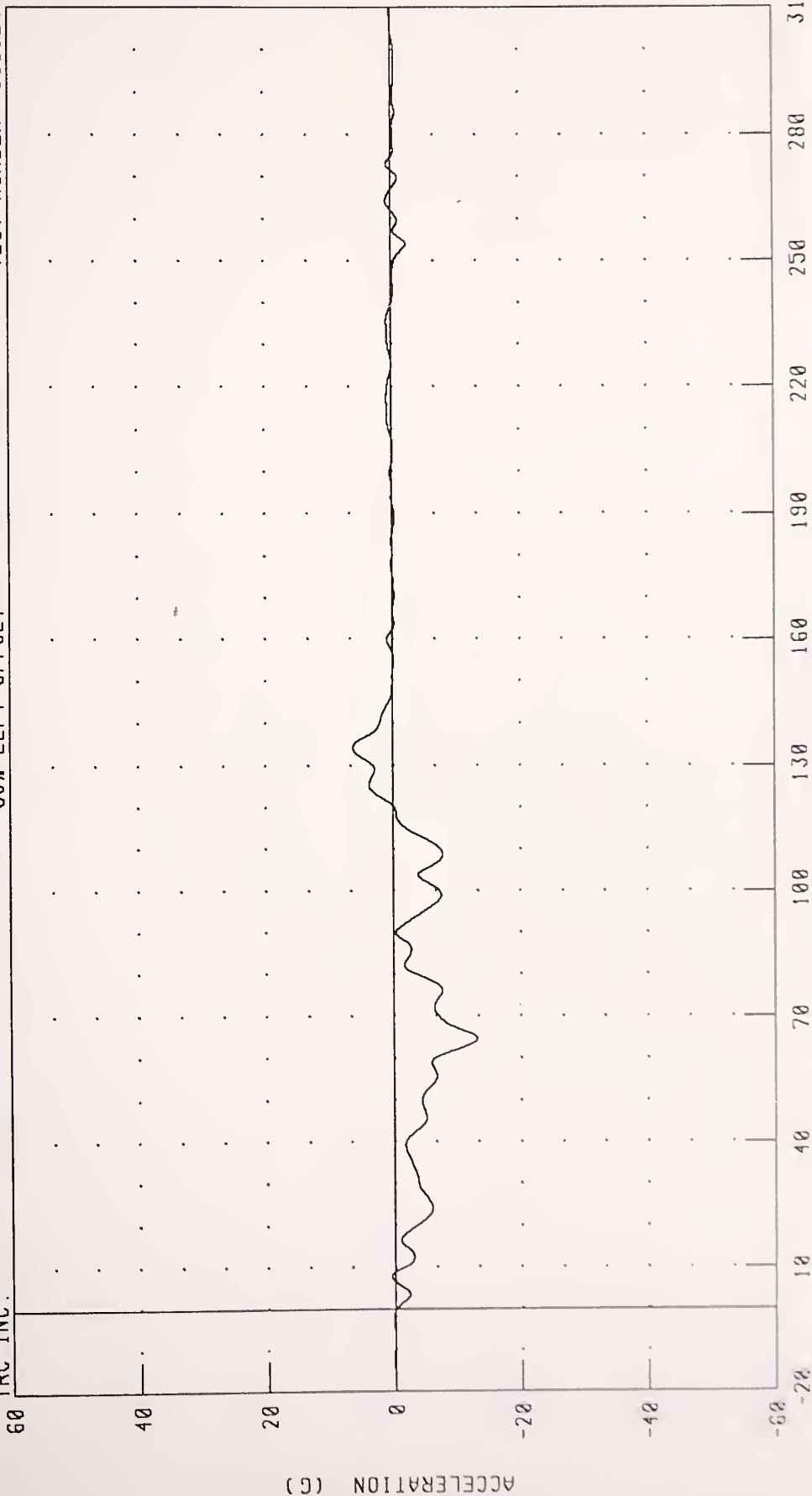
PEAK DATA: 4486.02 MM @ 310.00 MS, 0.00 MM @ 0.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
RIGHT REAR SEAT Y-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



CHANNEL TARYC1 FILTER CH CLASS 60

PEAK DATA: 6 29 G @ 134 32 MS, -13 15 G @ 64 72 MS

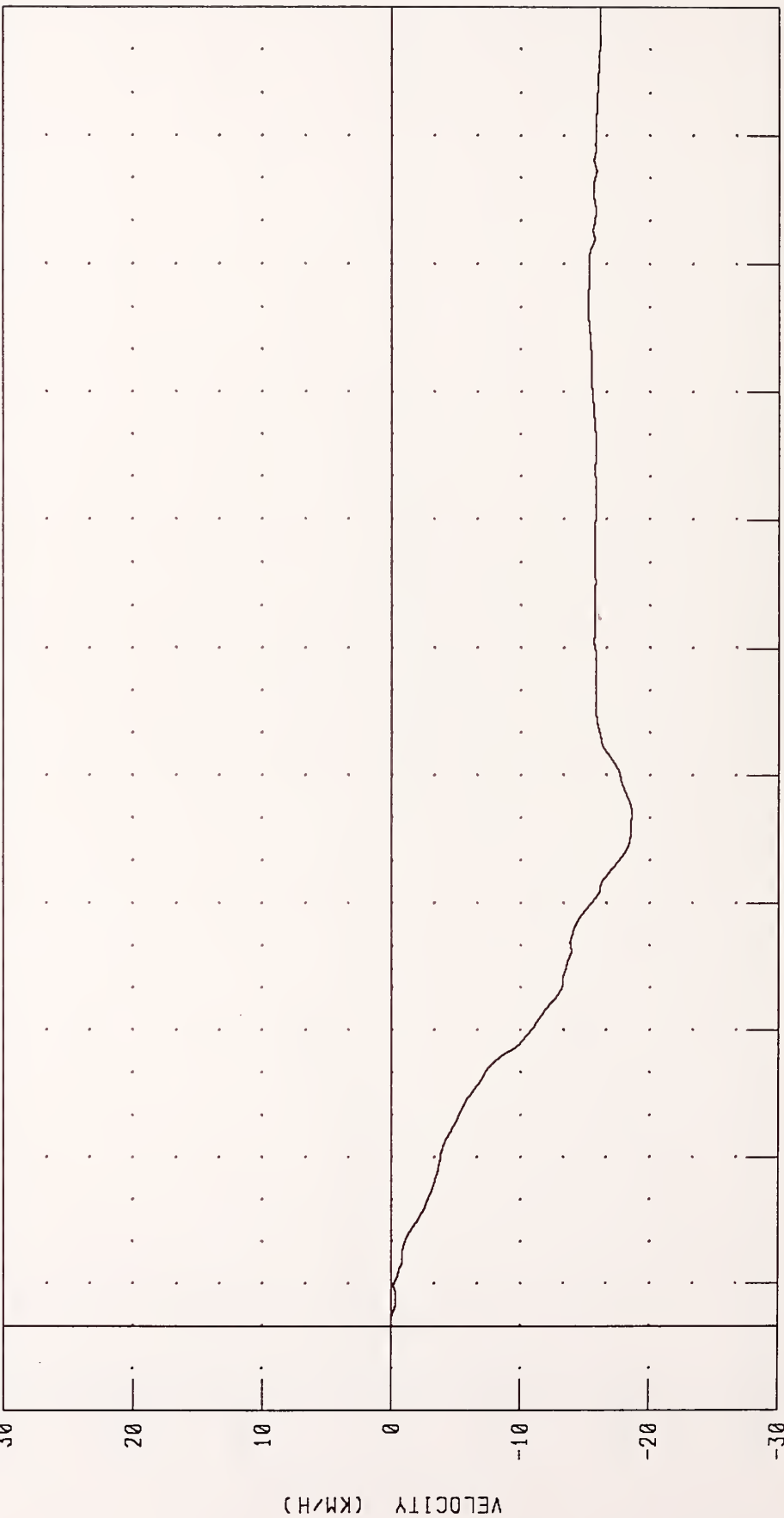
# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER

RIGHT REAR SEAT Y-AXIS VELOCITY

50% LEFT OFFSET

TEST NUMBER: 950525

TRC INC.



CHANNEL: TRRYV1 FILTER: CH. CLASS 180

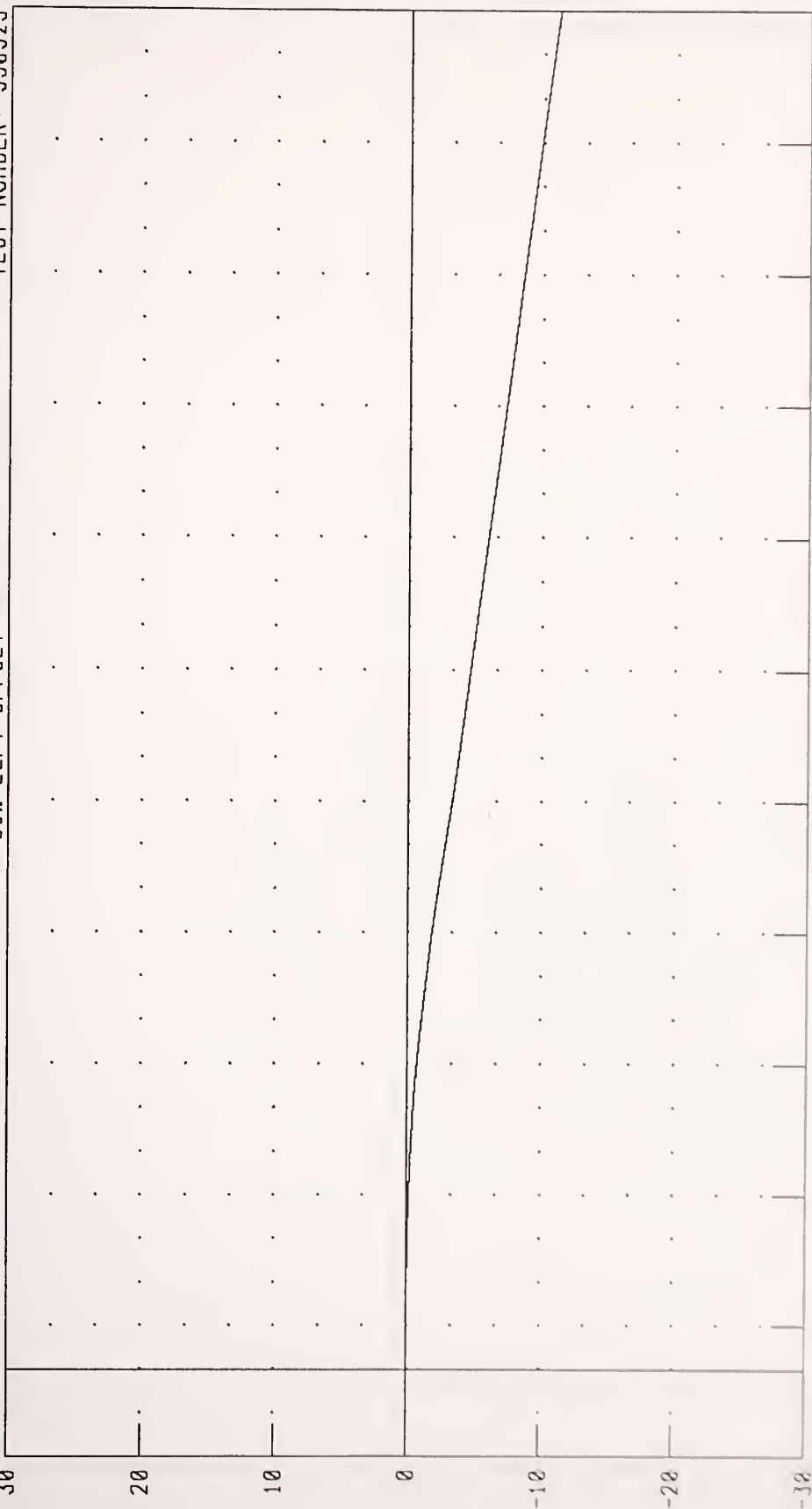
PEAK DATA: 0.01 KM/H @ 1.20 MS, -18.64 KM/H @ 121.04 MS

# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER RIGHT REAR SEAT Y-AXIS DISPLACEMENT

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



PEAK DATA 0 00 NM @ 1 76 MS, -1120 30 MM @ 310 00 MS

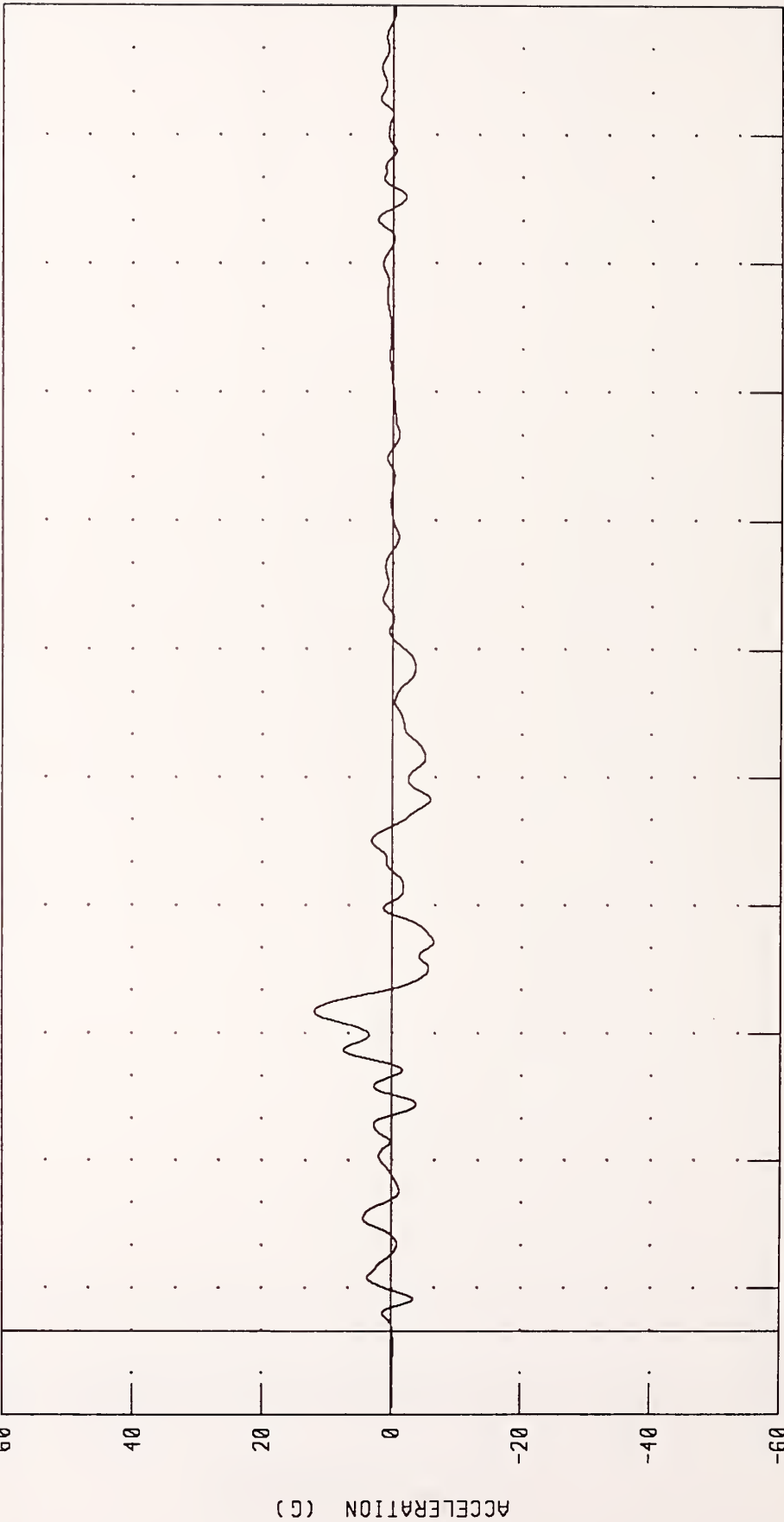
CHANNEL TARY01 FILTER CH CLASS 180

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
 RIGHT REAR SEAT Z-AXIS ACCELERATION

TEST NUMBER 950525

50% LEFT OFFSET

TRC INC.



CHANNEL: TRRZG1 FILTER: CH. CLASS 60

PEAK DATA: 11 98 G @ 75 12 MS; -6.44 G @ 91 36 MS

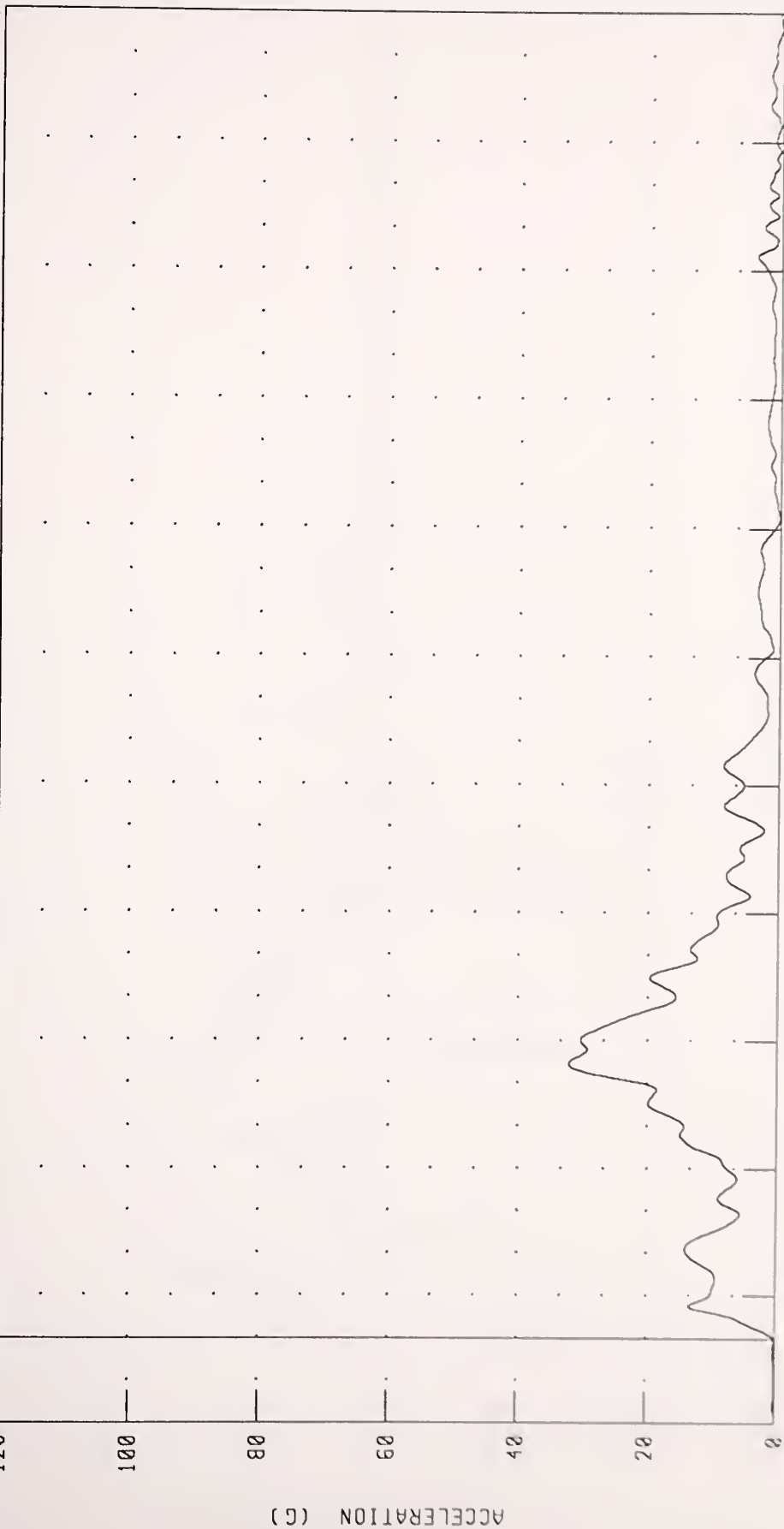


# 1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER RIGHT REAR SEAT RESULTANT ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



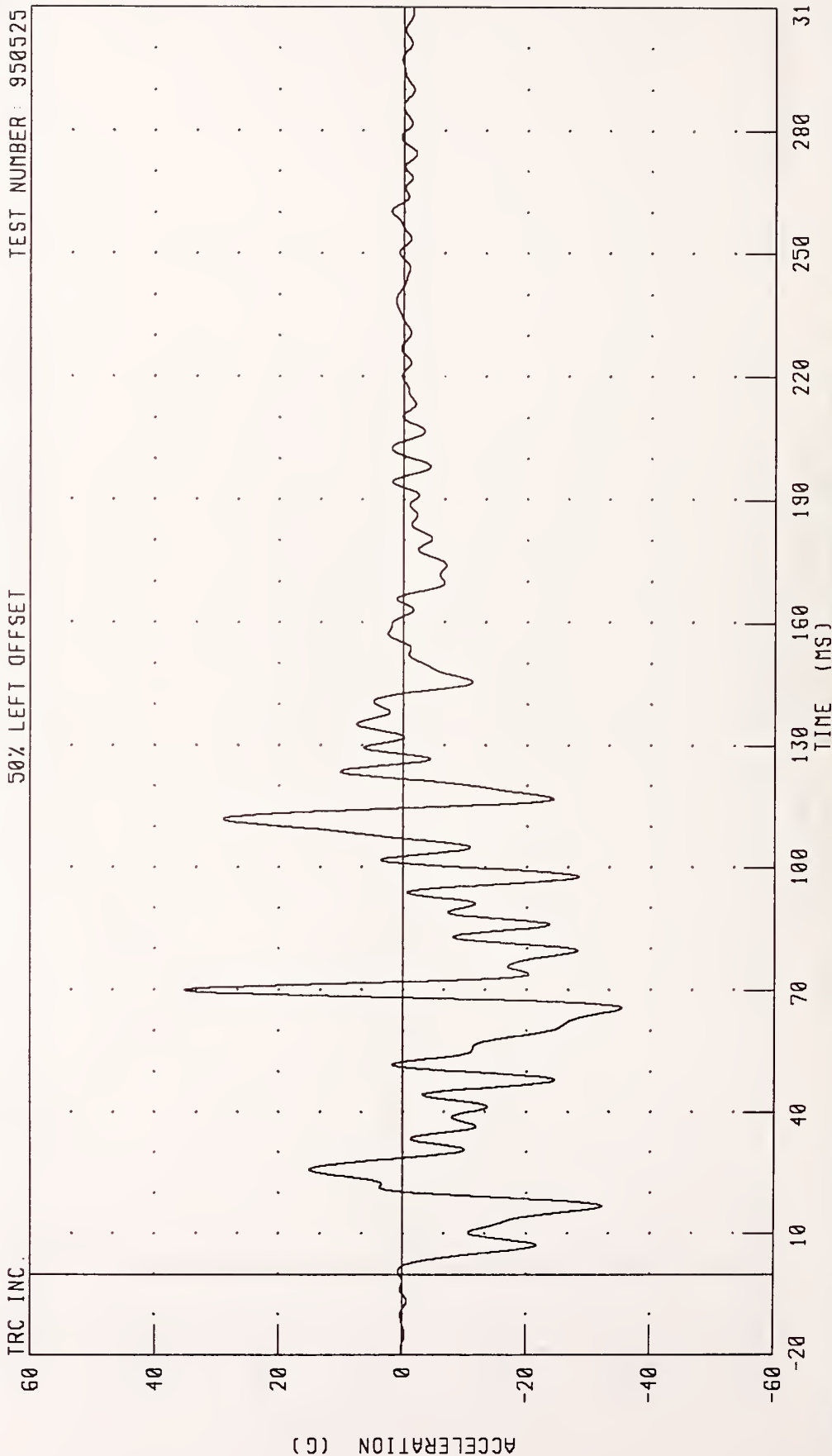
CHANNEL TARRC1 FILTER CH CLASS 60  
PEAK DATA 32 12 G @ 64 56 MS, 0 05 G @ -20 00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



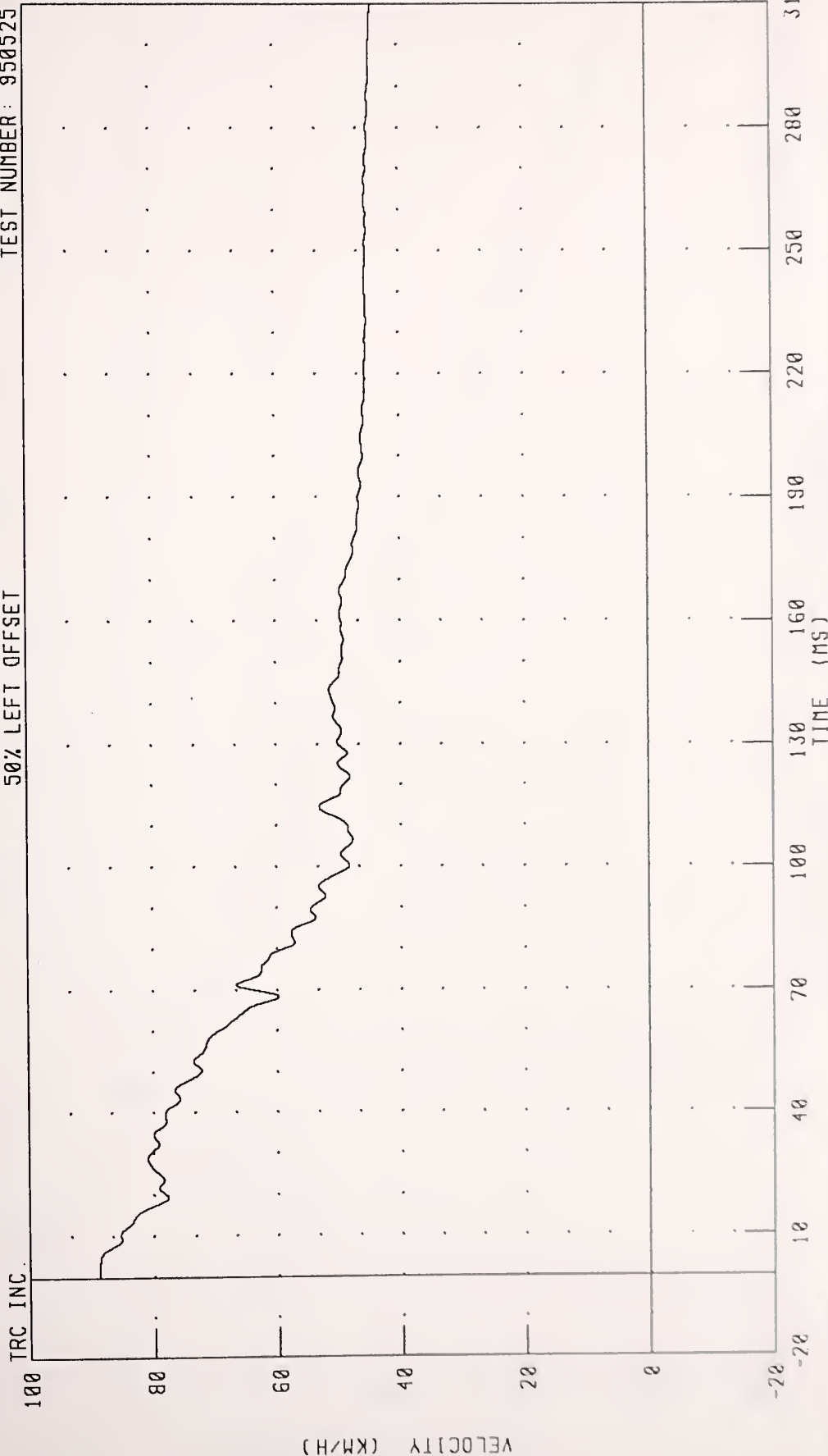
CHANNEL: DPCXG1 FILTER: CH CLASS 60

PEAK DATA: 35 24 G @ 70 00 MS, -35 38 G @ 65 68 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
INSTRUMENT PANEL CENTER X-AXIS VELOCITY

TEST NUMBER: 950525

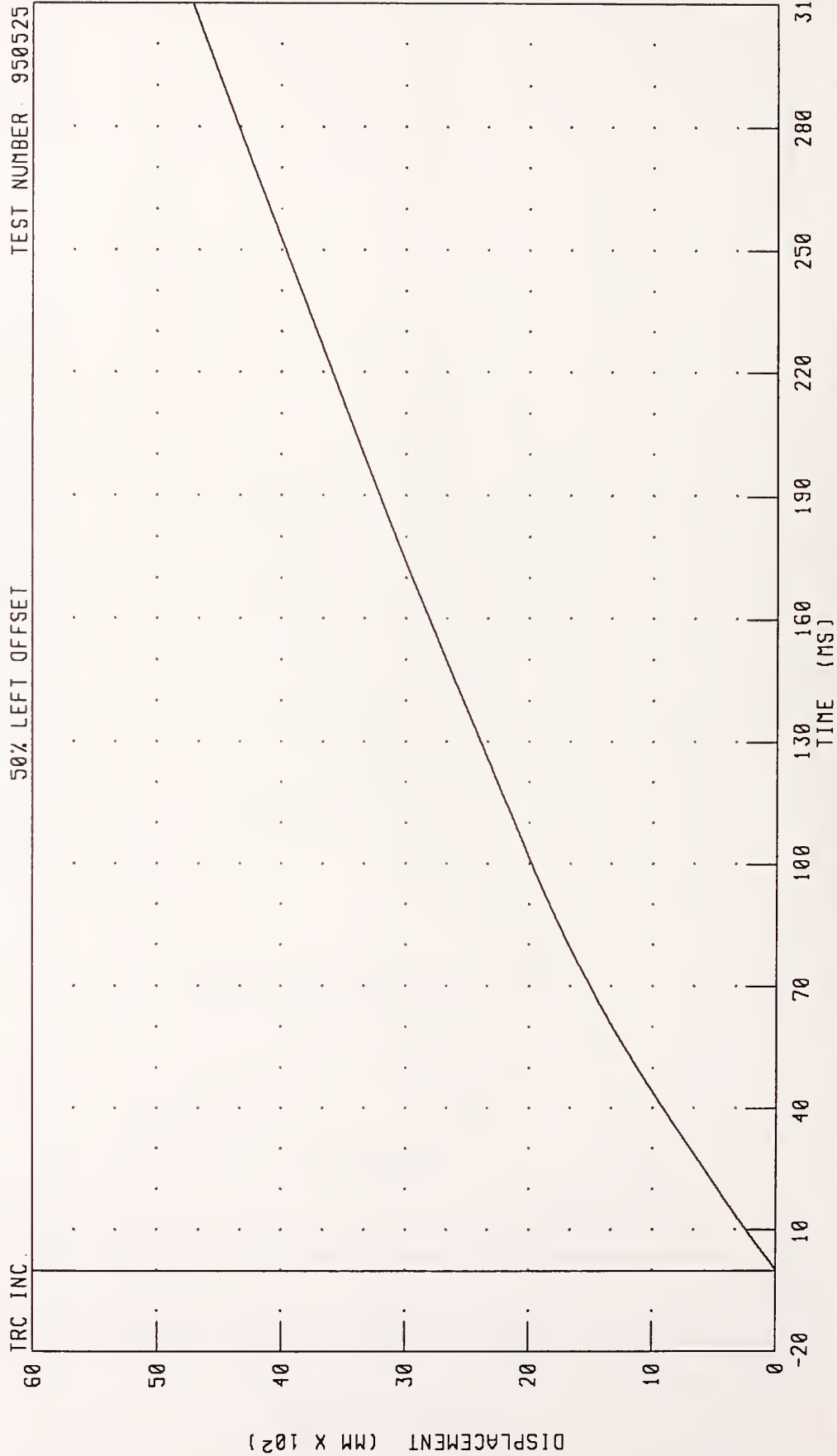
50% LEFT OFFSET



CHANNEL OPCXV1 FILTER CH CLASS 180

PEAK DATA 88 75 KM/H @ 168 MS, 44 28 KM/H @ 308 96 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
INSTRUMENT PANEL CENTER X-AXIS DISPLACEMENT



CHANNEL: DPCXD1 FILTER: CH CLASS 180

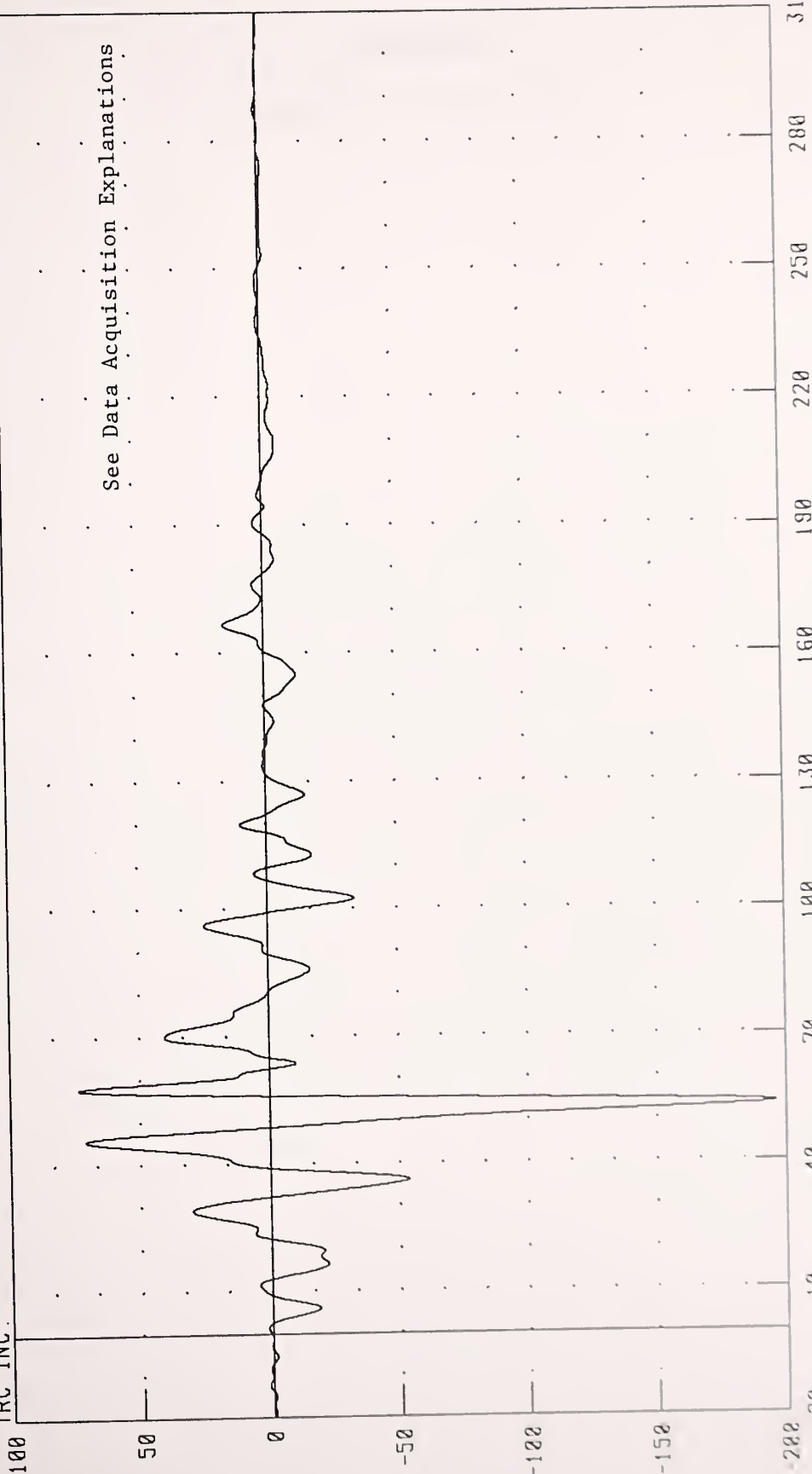
PEAK DATA: 4716.65 MM @ 310.00 MS, 0.00 MM @ 0.00 MS

1989 FORD TAURUS INTO MODIFIED HEAVY TRUCK BUMPER  
STEERING WHEEL HUB X-AXIS ACCELERATION

TEST NUMBER: 950525

50% LEFT OFFSET

TRC INC.



ACCELERATION (G)

TIME (MS)

PEAK DATA 73 71 G @ 57 84 MS, -196 03 G @ 53 76 MS

CHANNEL SH1XC1 FILTER CH CLASS 60



## Appendix C

### Miscellaneous Test Information





### Dummy Instrumentation Placement

Dummy Mfr. & S/N: Humanoid/043

Seating Position: Driver

Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
Head Acceleration	X	Endevco	7264	DC54J	Rear
Head Acceleration	Y	Endevco	7264	EY99J	Left
Head Acceleration	Z	Endevco	7264	EH75J	Up
Chest Acceleration	X	Endevco	7264	DC72J	Front
Chest Acceleration	Y	Endevco	7264	BC26J	Left
Chest Acceleration	Z	Endevco	7264	DG50J	Up
Chest Deflection	X	Servo	14CB1-2897	CP043	Outward
Pelvis Acceleration	X	Endevco	7264	BF42J	Rear
Pelvis Acceleration	Y	Endevco	7264	FJ66J	Left
Pelvis Acceleration	Z	Endevco	7264	DG56J	Up
Left Femur Force		GSE	2435	739	Tension
Right Femur Force		GSE	2430	741	Tension

### Vehicle Instrumentation Information

Test No. 950525

No.	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
1	Vehicle Center of Gravity					
	Longitudinal	X	Endevco	7264	AL40	Front
	Lateral	Y	Endevco	7264	AP87	Left
	Vertical	Z	Endevco	7264	BB68	Up
2	Left Front Sill					
	Longitudinal	X	Endevco	7264	BC41J	Front
	Lateral	Y	Endevco	7264	BD41J	Right
	Vertical	Z	Endevco	7264	BD75J	Up
3	Right Front Sill					
	Longitudinal	X	Endevco	7264	BE02J	Front
	Lateral	Y	Endevco	7264	BE24J	Left
	Vertical	Z	Endevco	7264	BF24J	Up
4	Left Rear Seat					
	Longitudinal	X	Endevco	7264	BG38J	Front
	Lateral	Y	Endevco	7264	BH14J	Left
	Vertical	Z	Endevco	7264	BH32J	Up
5	Right Rear Seat					
	Longitudinal	X	Endevco	7264	BI30J	Front
	Lateral	Y	Endevco	7264	BT29J	Right
	Vertical	Z	Endevco	7264	DF92J	Up
6	Instrument Panel Center					
	Longitudinal	X	Endevco	7264	DM66J	Rear
7	Steering Wheel Hub					
	Longitudinal	X	Endevco	7264	DP87J	Rear
	Lap Belt Outboard Force		Lebow	3419	590	Tension
	Shoulder Belt Outboard Force		Lebow	3419	312	Tension

Sign Convention  
NHTSA Data Tape Reference Guide

Accelerometers:

+X: Forward  
+Y: Leftward  
+Z: Upward

Potentiometers:

+Chest Longitudinal Deflection: outward  
+Chest Lateral Deflection: leftward  
+Seat Belt Displacement: outward  
+Seat Belt Extension: elongation  
+Knee Slider Displacement: distance between femur and tibia  
increased (in relation to a seated  
dummy)

Load Cells:

+Femur Force: tension  
+Seat Belt Force: tension  
+Barrier Force: tension

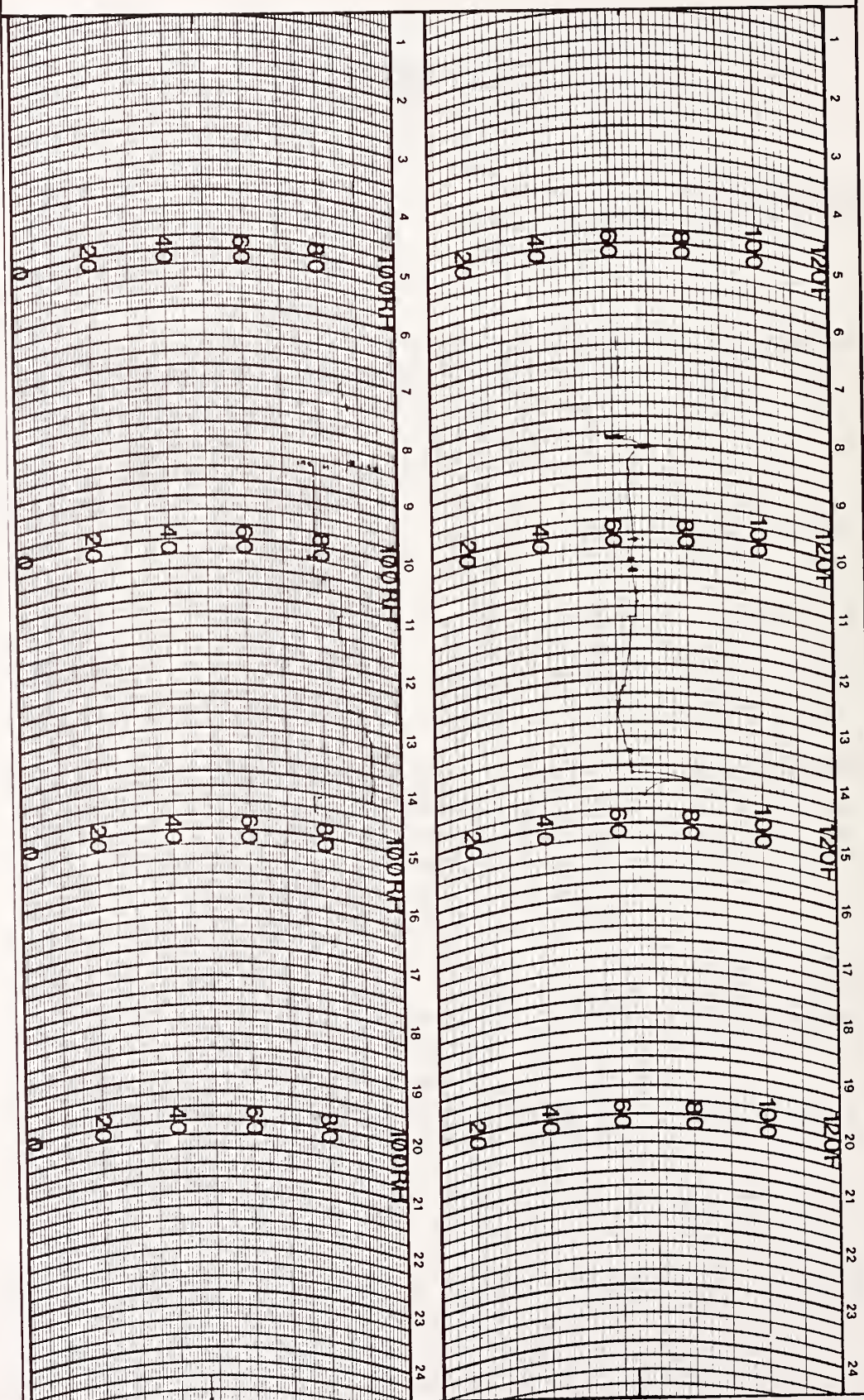
Neck Load Cells:

+X Force: head pushed forward  
+Y Force: head pushed leftward  
+Z Force: head pulled upward (tension on neck)  
+X Moment: right ear rotating toward right shoulder  
+Y Moment: chin rotating toward chest  
+Z Moment: chin rotating toward left shoulder

Tibia Load Cells:

+X Force: tension  
+Y Force: tension  
+Z Force: tension  
+X Moment: bottom of tibia moving leftward  
+Y Moment: bottom of tibia moving rearward





WEATHER MEASURE  
PO. BOX 41257  
SACRAMENTO, CA. 95841  
PHONE (916) 481-7565

HYGROTHERMOGRAPH  
1 DAY

CHART # C311 D HF  
PART # 699123

STATION

950525

DATE ON

DATE OFF

Occupant Compartment Thermograph









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